Optical Control Systems

OCS Products

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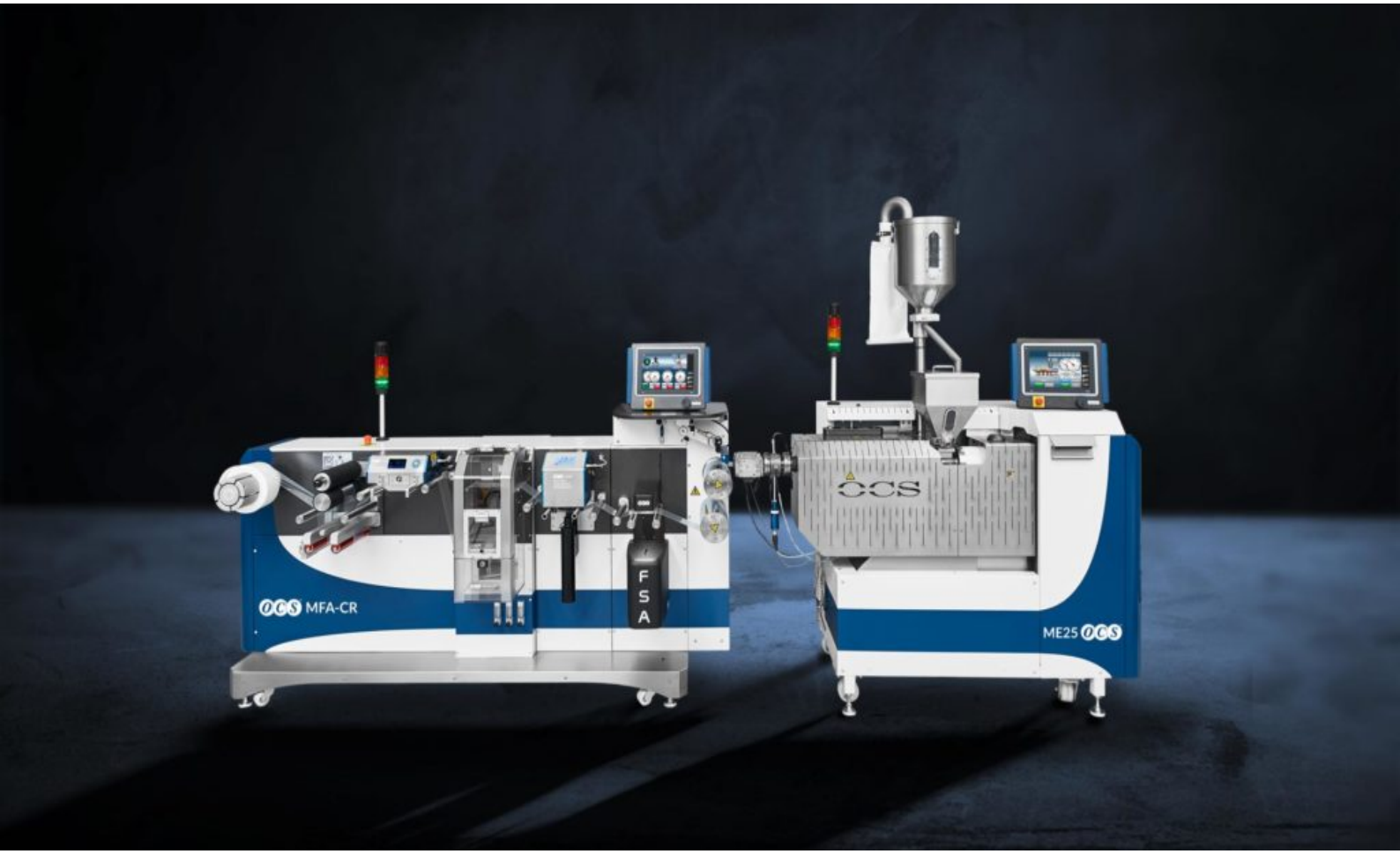

Cast Film Line

The OCS Cast Film Line is used to perform optical and physical property measurements of polymers in the production of high-quality cast (flat) films (extrusion, cooling, stripping and winding). All settings and parameters, e.g. extruder speed, temperature, film tension, winding force, winder diameter, are stored by a touch panel control system which guarantees that the film quality can be reproduced at any time. This is an important parameter for optical and physical on-/offline measurements, for example in detecting gels, contaminations, degradations and other impurities as well as haze, gloss, density and additive measurement.

Possible testable polymers include, for example, PP, PET, PC,HDPE and LDPE.

Testable Raw Materials

- Pellets, powders and flakes

Module I + II (included)

- Measuring Extruder (ME20/ME25/ME30/ME40/ME45) with fix lip die 50–150 mm or flex lip die 150–350 mm
- Modular Film Analyser with two chill rolls (MFA-CR)
- Film Surface Analyser (FSA100V2/FSA200V2)

Features

- Measuring Extruder (ME) comes with flexible height adjustment (infusion position)

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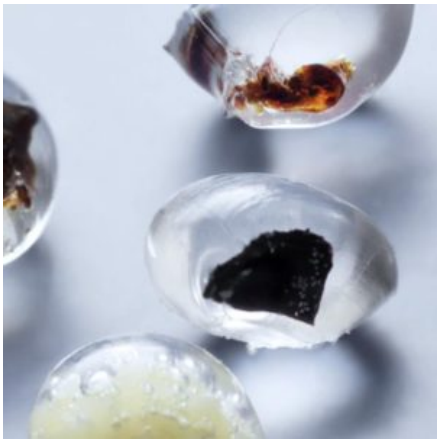
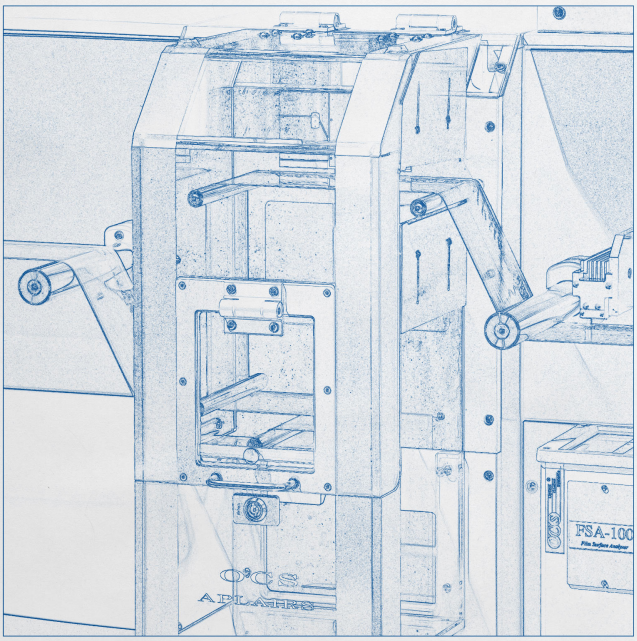
- Maintenance and cleaning positions of the Measuring Extruder (ME) can be approached by means of an electric motor
- Modular architecture of the Modular Film Analyser (MFA) to facilitate customisation of additional measuring devices
- Operation via touch panel with data trend as well as optical and acoustic alarm functions
- All system parameters are monitored and saved in the touch panel control system
- Several options are available for data communication



Technical Details

Fix lip die	50–150 mm
Flex lip die	150–350 mm
Die gap	0.5–1.2 fix lip die, max. 2.0 mm flex lip die
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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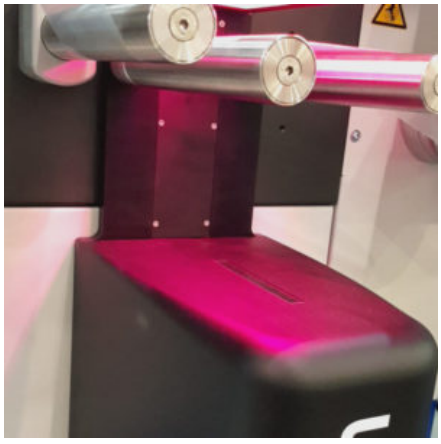

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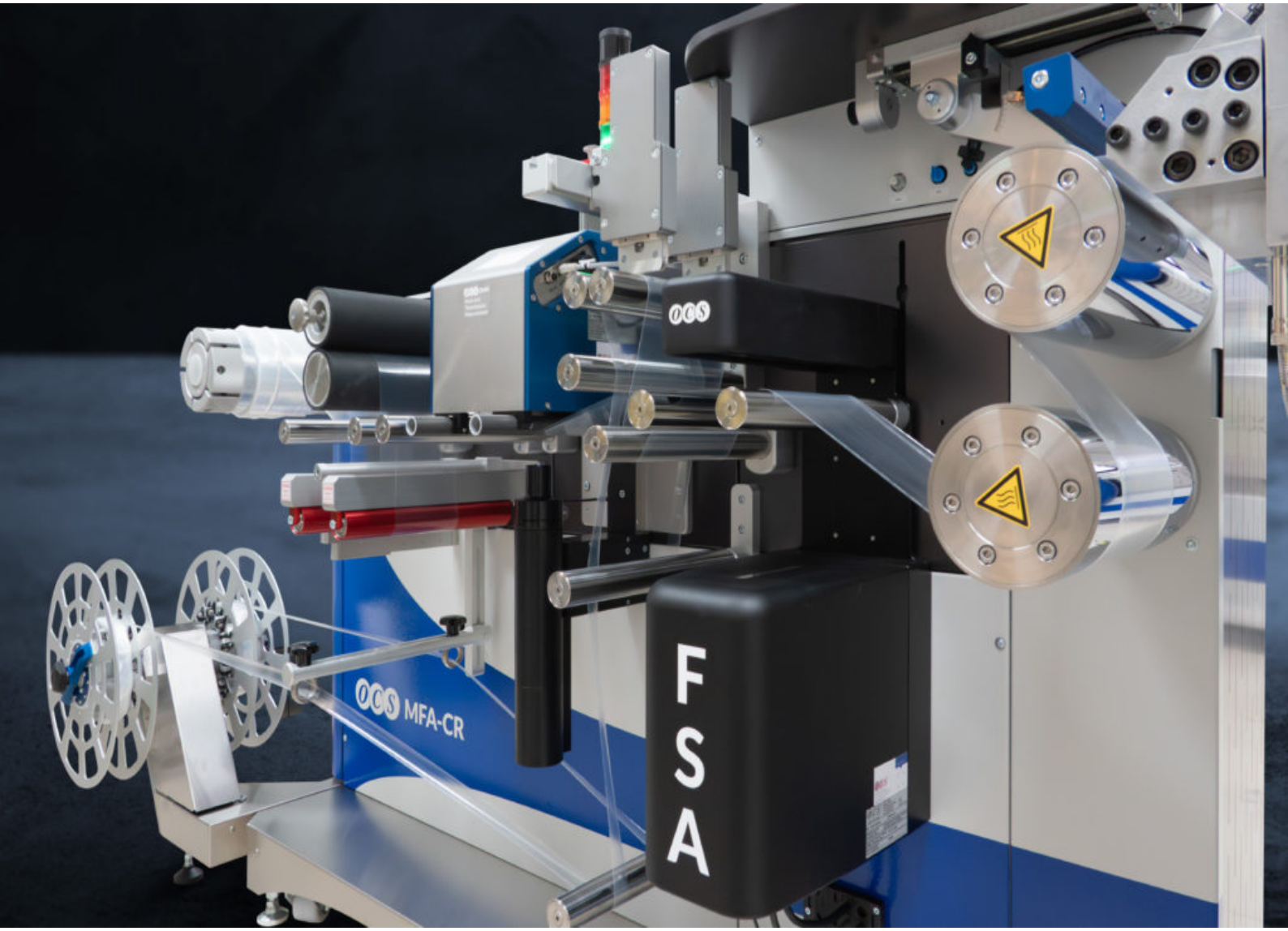

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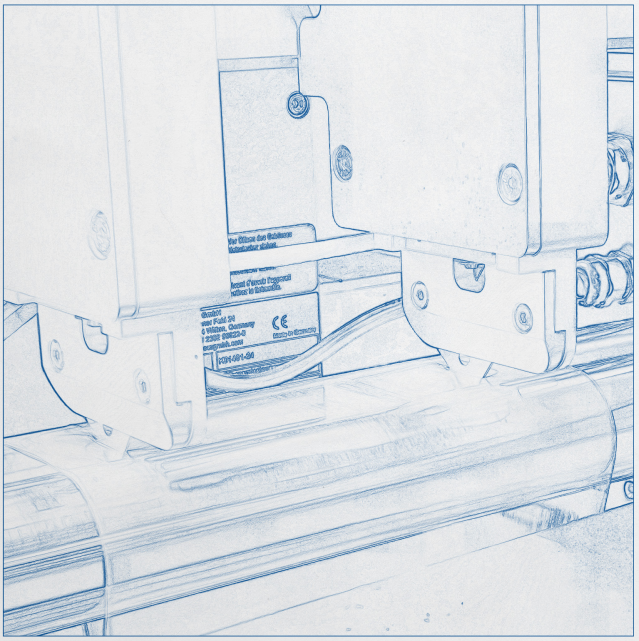
Technical Details

Eigenschaft 1	100
Eigenschaft 2	200



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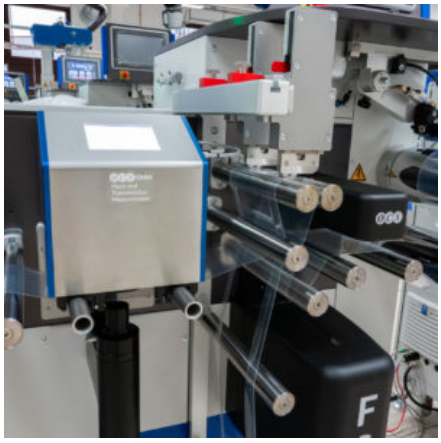

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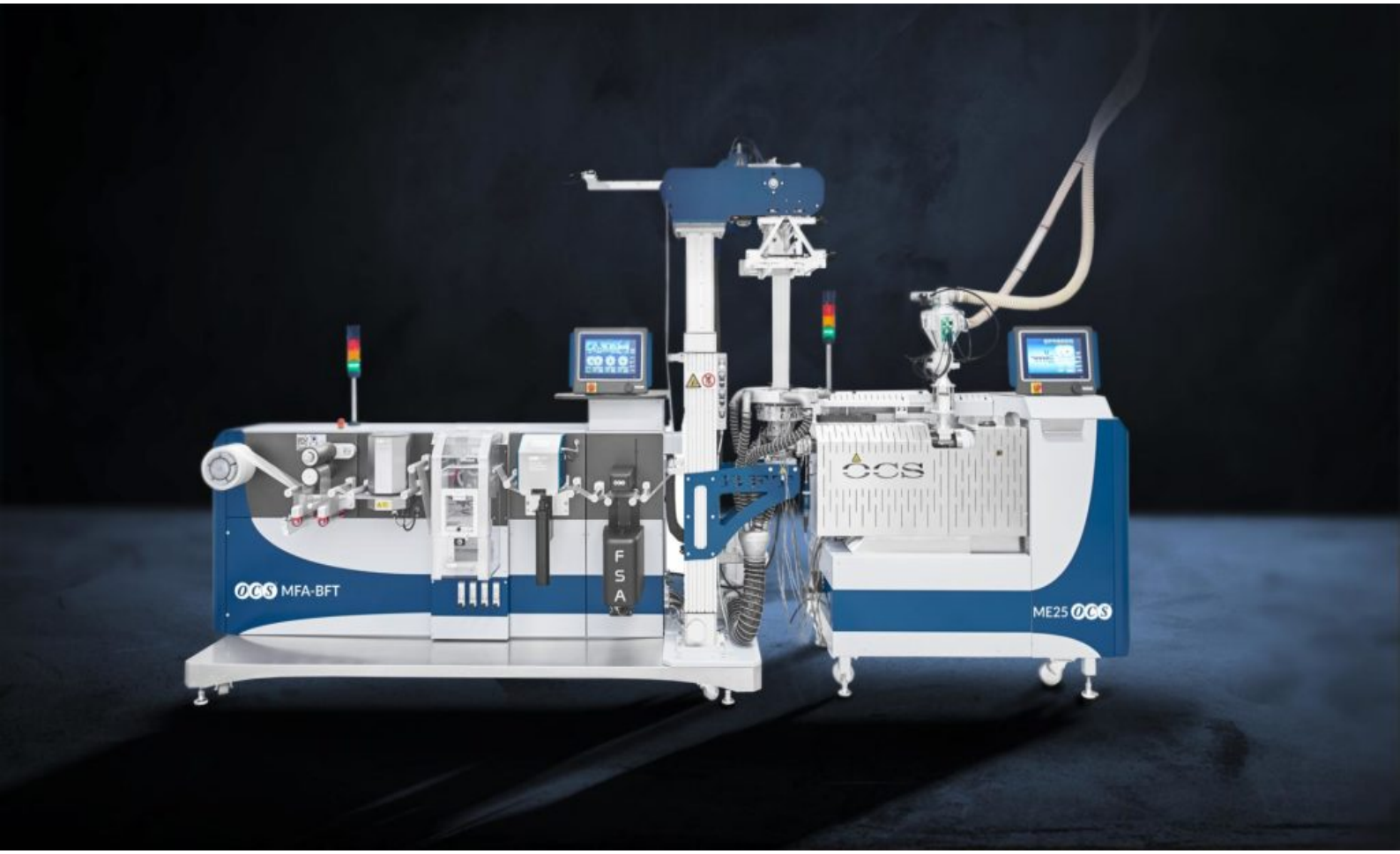

Blown Film Line

The OCS Blown Film Line is used to carry out optical and physical property measurements of polymers in the production of high-quality blown films (blowing, cooling, laying flat, haul-off and winding). All parameters of the line, e.g. extruder speed, temperature, haul-off speed, film width, film bubble ratio, are stored by a touch panel control system, which ensures that the film quality is reproducible at any time. This is an important parameter for optical and physical on-/offline measurements, for use with gels, impurities, fibres and other contaminants, as well as for turbidity, transmission, gloss, density and additive measurements.

Possible testable polymers include, for example, LLDPE, LDPE, PP and HDPE.

Testable Raw Materials

- Pellets, powder and flakes

Module I + II (included)

- Measuring Extruder (ME20/ME25/ME30/ME40/ME45) with blown film die 30–80 mm
- Modular Film Analyser with Blown Film Tower (MFA-BFT)
- Film Surface Analyser (FSA100V2/FSA200V2)

Features

- Cleaning positions of the Measuring Extruder (ME) can be approached via electric motor
- Modular architecture of the Modular Film Analyser (MFA) to facilitate customisation of

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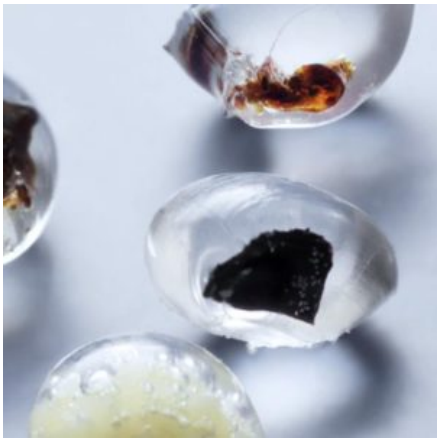
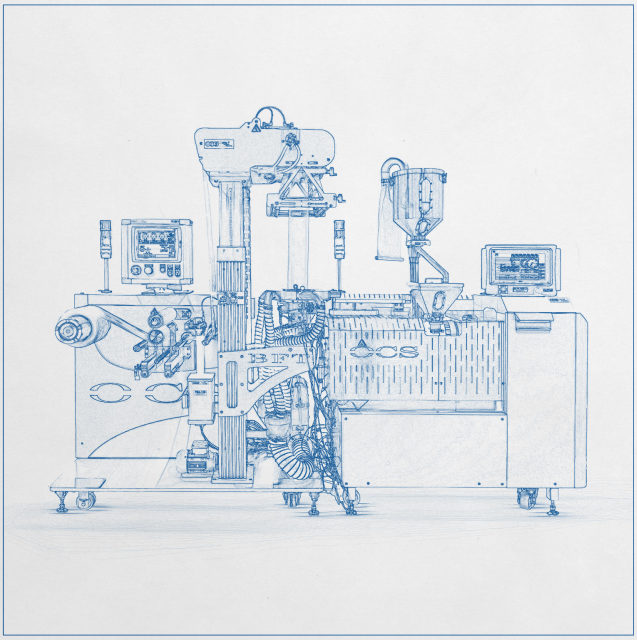
additional measuring and test devices

- Automatic control of the bubble diameter according to the preset film width
- Operation via touch panel with data trend as well as optical and acoustic alarm functions
- All system parameters are monitored and saved in the touch panel control system



Technical Details

Blown film die	30–80 mm
Die gap	0.5–1.5 mm (depending on nozzle diameter)
Bubble diameter	max. 320 mm
Flattened film width	max. 400 mm
Haul-off speed	0–15 m/min (optional 30 m/min)
Haul-off force	0–20 N
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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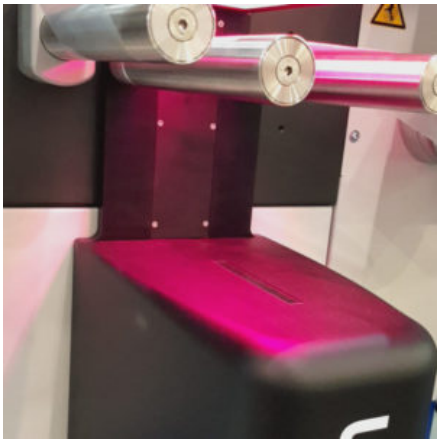

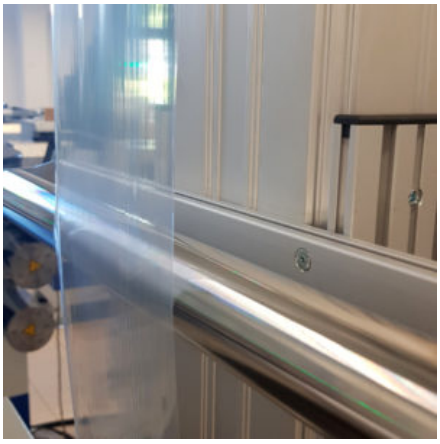

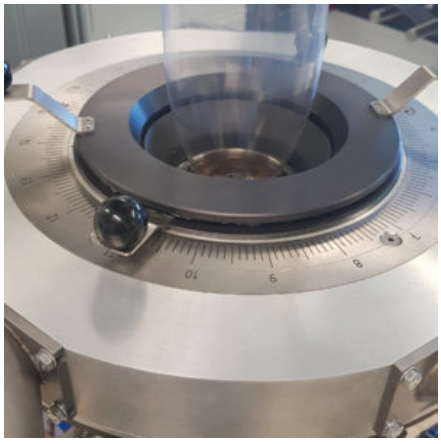

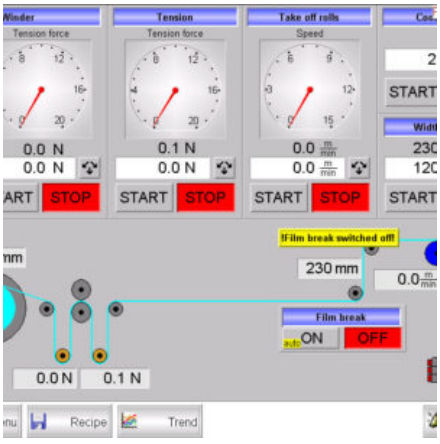

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Tape Line (SSA®)

The OCS Tape Line type SSA® is used specifically to detect surface irregularities (pips) on non-transparent polymer films (tape) in the wire and cable industry. The SSA® Line consists of a Measuring Extruder (ME) and a Modular Film Analyser with a Chill Roll (MFA-CR). During the measurement of the surfaces, the extruded polymer film (tape) passes over a chill roll, which leads the tape to the Surface Quality Analyser (SQA).

This high-resolution CMOS camera system uses a specially developed measuring roll to measure the height of the surface defects (so-called pips or agglomerates) with a resolution of 1 µm. In addition, the base diameter and the diameter at half the height of the surface defects are measured with a resolution of 10 µm. The analysis software provided allows the user to define height and diameter classes and to classify the measured pips based on these definitions.

The pips can then be marked with the LASER Marking System (LM100) or the Label Printer (LP100). The polymer film is then cut into strips using the OCS Film Cutter and Sorter (OFC100) and sorted into containers. The entire system can be easily managed via the control unit with software-based touch panel, for example to set device parameters, film tension and speed.

Testable Raw Materials

- Pellets/non-transparent polymer films (tape), powder and flakes

Module I + II (included)

- Measuring Extruder (ME20/ME25/ME30) with pip die of 50 mm
- Modular Film Analyser with one Chill Roll (MFA-CR)

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- Surface Quality Analyser (SQA100) – optionally with Film Thickness Measurement

Features

- Measuring Extruder (ME) comes with flexible height adjustment (infusion position)
- Maintenance and cleaning positions of the Measuring Extruder (ME) can be approached via electric motor
- Modular architecture of the Modular Film Analyser (MFA) to facilitate customisation of additional measuring devices
- Operation via touch panel with data trend as well as optical and acoustic alarm functions
- All system parameters are monitored and saved in the touch panel control system
- Several options for data communication available

Technical Details

Pip die	50 mm
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific

More Product Pictures

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Tape Line (TCA®)

The OCS Tape Line Type TCA® is used for testing transparent polymer films (tape). It consists of the OCS Measuring Extruder (ME) and the OCS Modular Film Analyser with Calender (MFA-Calender). Our calendaring system has been specially developed for the wire and cable industry. It presses and cools the extruded polymer film (tape) from both sides, thus ensuring a smooth and consistent surface thickness for optical anlysis.

The Tape Quality Analyser (TQA100) contains a high-resolution camera system that detects contaminants, gels, black specks, fibres and metal particles. The detected errors are marked by the LASER Marking System (LM100) or the Label Printer (LP100). The polymer film is then cut into strips using the OCS Film Cutter and Sorter (OFC100) and sorted into appropriate containers. Additional physical, chemical and optical test systems can be integrated on customer request.

Testable Raw Materials

- Pellets/transparent polymer films (tape), powder and flakes

Module I + II (included)

- Measuring Extruder (ME20/ME25/ME30) with fix lip die of 50–75 mm
- Modular Film Analyser with Calender (MFA-Calender)
- Tape Quality Analyser (TQA100)

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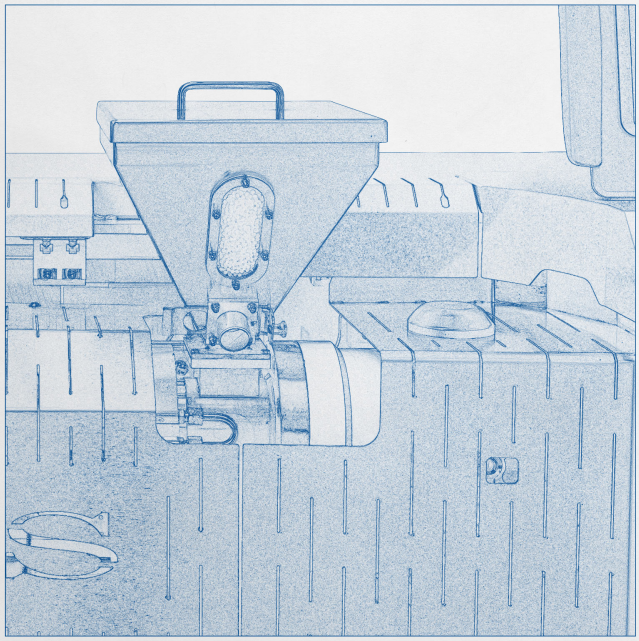
Features

- Measuring Extruder (ME) comes with flexible height adjustment (infusion position)
- Maintenance and cleaning positions of the Measuring Extruder (ME) can be approached via electric motor
- Modular architecture of the Modular Film Analyser (MFA) to facilitate customisation of additional measuring devices
- Operation via touch panel with data trend as well as optical and acoustic alarm functions
- All system parameters are monitored and saved in the touch panel control system
- Several options for data communication available

Technical Details

Fix lip die	50–75 mm
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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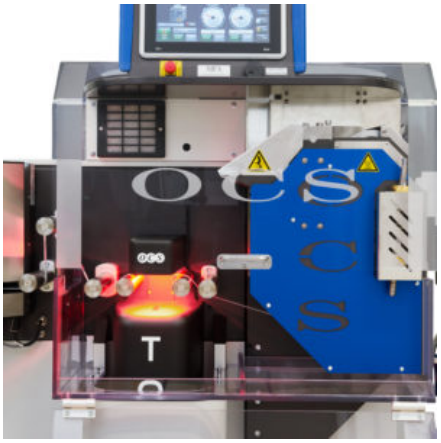

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Measuring Extruder (ME20/ME25/ME30/ME40/ME45)

The OCS Measuring Extruder (ME) is used for the production of polymer films for laboratory and small series production. The extruder is equipped with a flat film die and, if necessary, a downstream OCS Modular Film Analyser to enable further quality measurements. The system is controlled via a touch panel to set up device parameters and recipes. In addition, the optional Remote Control Function allows the Measuring Extruder (ME) to be displayed and controlled from various locations. Another feature is the automatic turning system, which allows easy cleaning of the extruder barrel, die and screw. The extruder then automatically returns to its exact setting position to simulate the same condition as during production.

Features

- High-quality laboratory design with plasticising unit in stainless steel
- Robust, precise drive technology
- Operation via touch panel with data trending as well as optical and acoustic alarm functions
- Temperature zone control through self-optimising PID controllers
- Simple data and recipe processing

Compatible with

- OCS Cast Film Line
- OCS Blown Film Line
- OCS Tape Line

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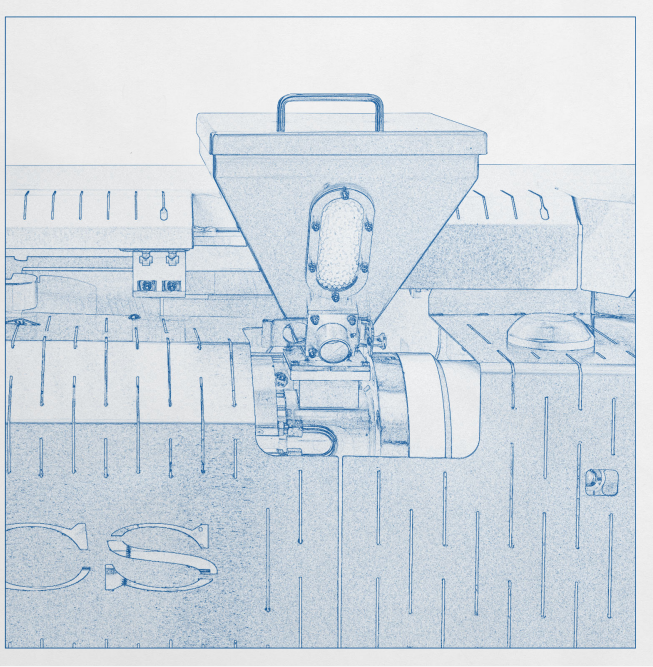
- OCS Modular Film Analyser (MFA)
- OCS Pelletising System
- OCS Pellet Transport System (PTS)

Technical Details

Drive technology / speed range	0.2–150 rpm
Screw diameter	20, 25, 30, 40 or 45 mm
Temperature zones	0–350 °C (further on request)
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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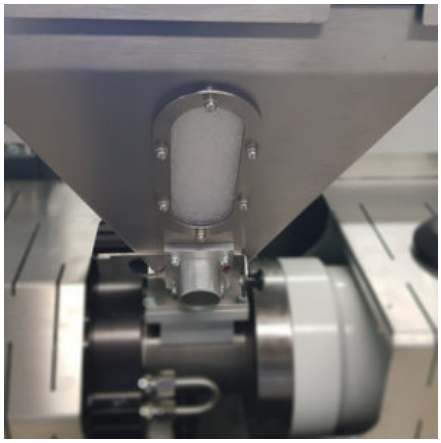

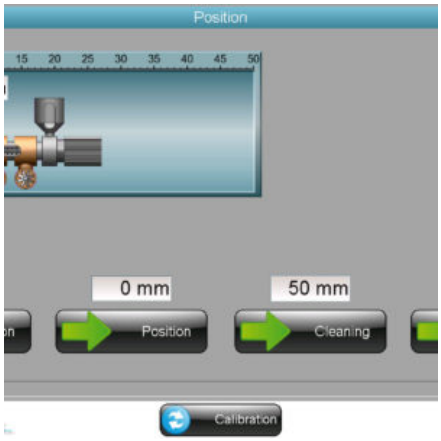

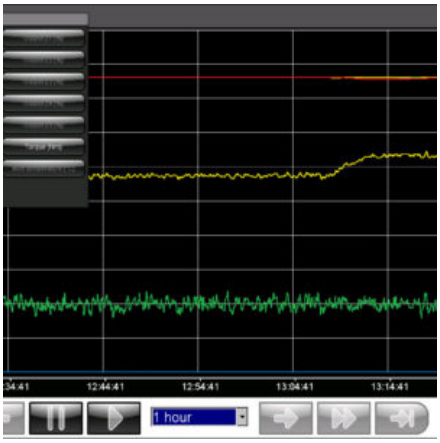

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Modular Film Analyser (MFA)

The OCS Modular Film Analyser (MFA) is used for the continuous cooling, stripping and winding of extruded polymer film. In combination with a variety of different measuring instruments, a wide range of applications for the analysis of different sample materials is covered.

In addition to the Film Surface Analyser (FSA100V2/FSA200V2) for optical quality control of the polymer film, online spectroscopy, the measurement of haze and transmission as well as gloss and thickness can be integrated. This allows the combination of a tailor-made and yet economical solution.

Features

- Modular architecture for customer-specific configuration with different measurement devices
- Homogeneous, yet fast tempering of the polymer melt
- Wide control range of film speed and tensile force for adaptation to a large variety of sample materials
- Intuitive operation via Touch Panel
- Simple winding change thanks to pneumatic winding mandrel
- Comprehensive alarm and status monitoring for autonomous operation

Variants

- OCS Modular Film Analyser with one/two Chill Roll(s) (MFA-CR)
  – OCS Cast Film Line or OCS Tape Line (SSA)

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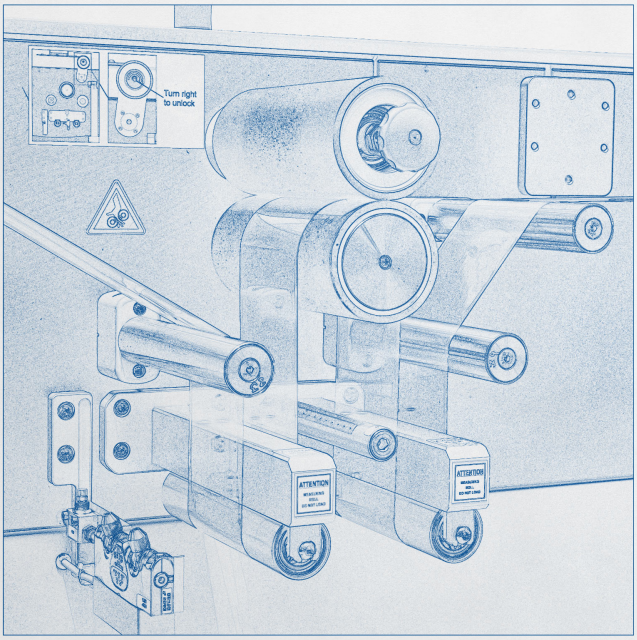
- OCS Modular Film Analyser with Blown Film Tower (MFA-BFT)
  – OCS Blown Film Line
- OCS Modular Film Analyser with Calender (MFA-Calender)
  – OCS Tape Line (TQA)

Technical Details

Haul-off speed	Up to 15 m/min (optional 30 m/min)
Chill rolls	Working width: 200, 300, 400 mm, material: stainless steel, chromium-plated or with non-stick coating
Winder	Sleeveless pneumatic mandrel, winding diameter of up to 600 mm
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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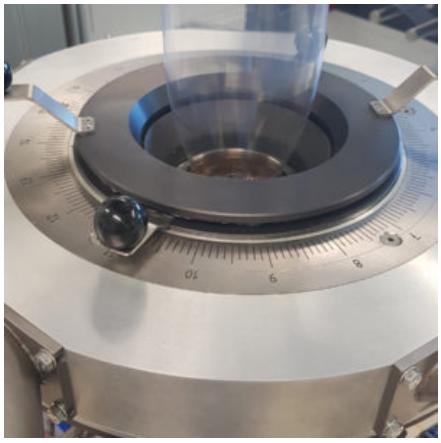

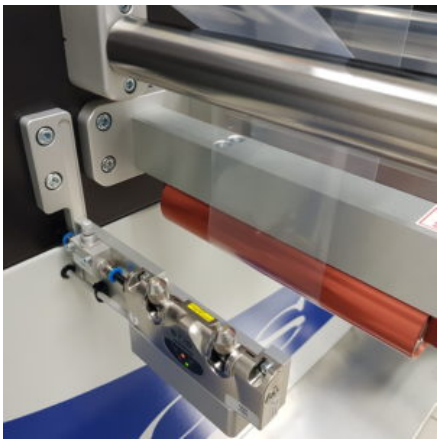

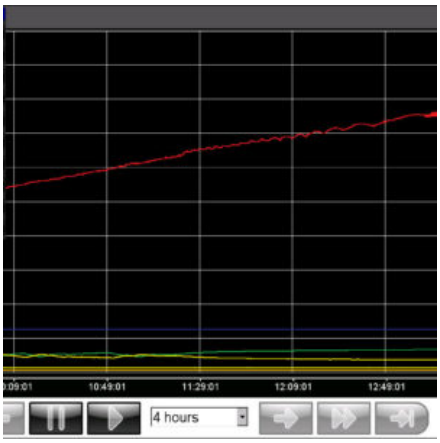

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Film Thickness Measurement (FTM)

The OCS Film Thickness Measurement (FTM) allows the continuous measurement of the thickness of polymer film (flat film, blown film or tape). For measurement, the film is guided between two precision rollers. One of the rollers is deflected according to the film thickness. This deflection is measured by a digital probe and evaluated by microcontroller-based electronics. The measured value is shown on a display and can be evaluated via analogue or digital interfaces.

Measurable Materials

- Polymer films

Features

- Continuous thickness measurement of the polymer film

Optional

- Customer-specific data preparation and transfer
- Remote control (via communication protocol or digital I/O)

Compatible with

- OCS Cast Film Line
- OCS Blown Film Line

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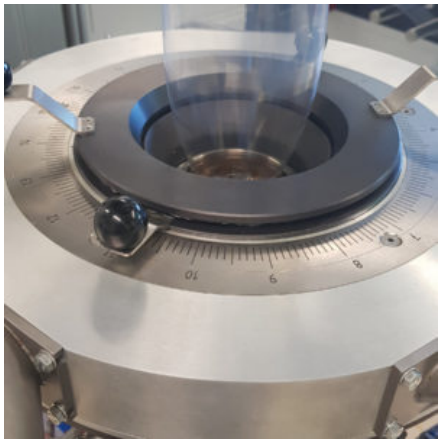
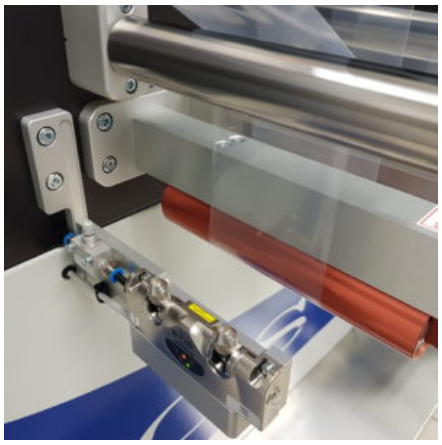
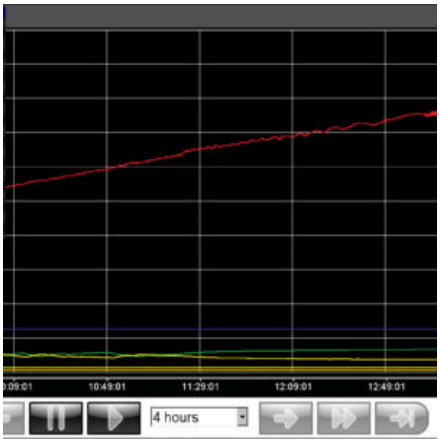
- OCS Tape Line (TCA)
- OCS Modular Film Analyser (MFA)

Technical Details

Measuring range	0–5000 µm
Exactness	+/– 1 µm
Haul-off force	1 N
Haul-off speed	0–20 m/min
Communication protocol	MODBUS/RTU (further protocols on request)







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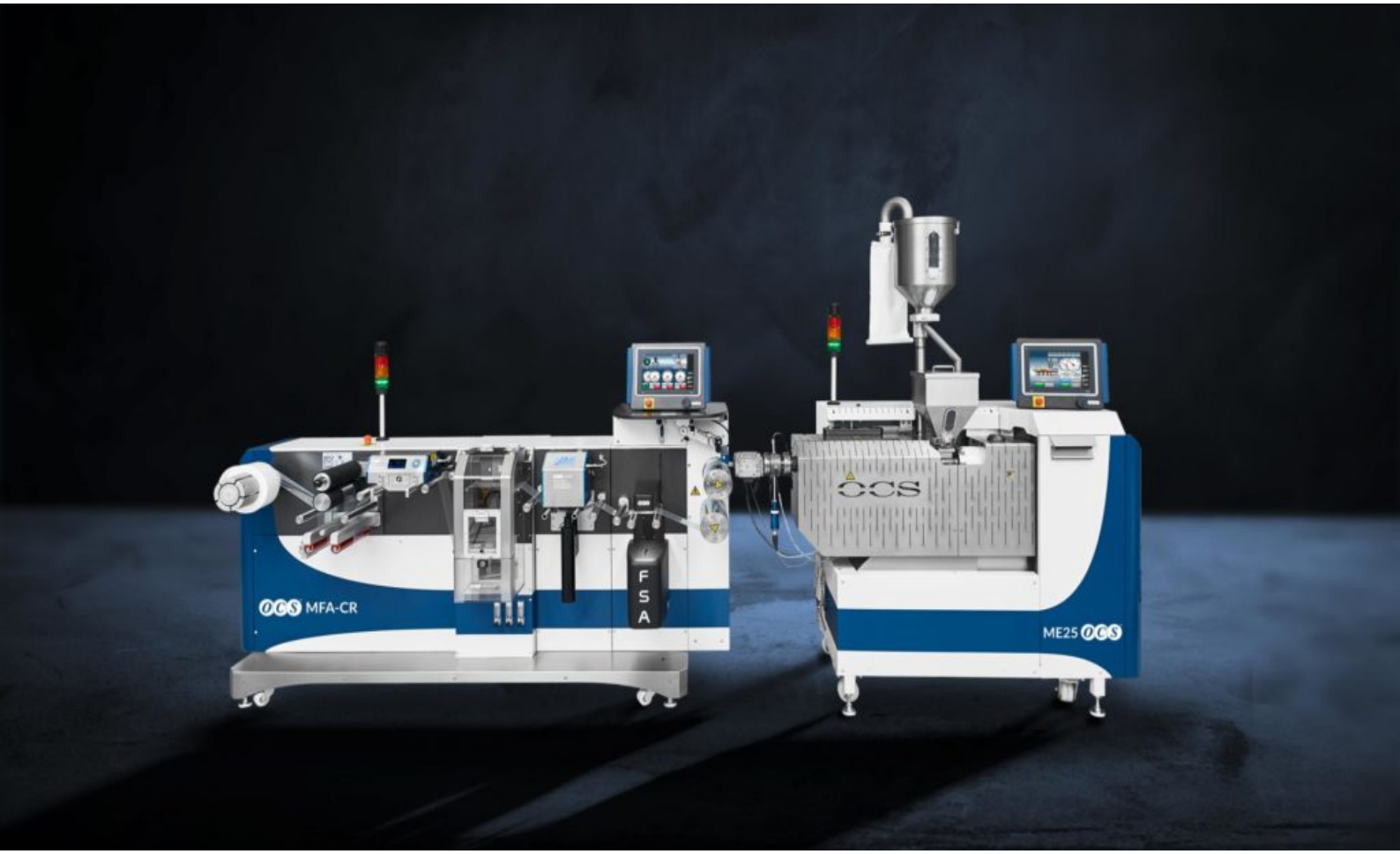

Gloss Measurement (OGM)

The OCS Gloss Measurement (OGM) is designed for the constant and precise control of film gloss properties. The measuring device is integrated into the Modular Film Analyser (MFA). It enables a continuous measurement of the gloss value on polymer film. The gloss properties of films are analysed based on their different ability to reflect light. A special LED lighting unit illuminates the continuous film while a photo diode measures the strength of the reflected light. The measured amount of gloss, from matt to glossy, is given in GU (Gloss Units).

Measurable Materials

- Polymer films

Features

- Robust, precise measuring unit
- Gloss measurement in GU (Gloss Units), matt to gloss
- Alarm function when limit value exceeds or falls below a specified range
- Continuous measurement of the gloss value as well as calibration according to ASTM D523, DIN 67530, DIN EN 14086 and ASTM D2457

Compatible with

- OCS Cast Film Line
- OCS Blown Film Line

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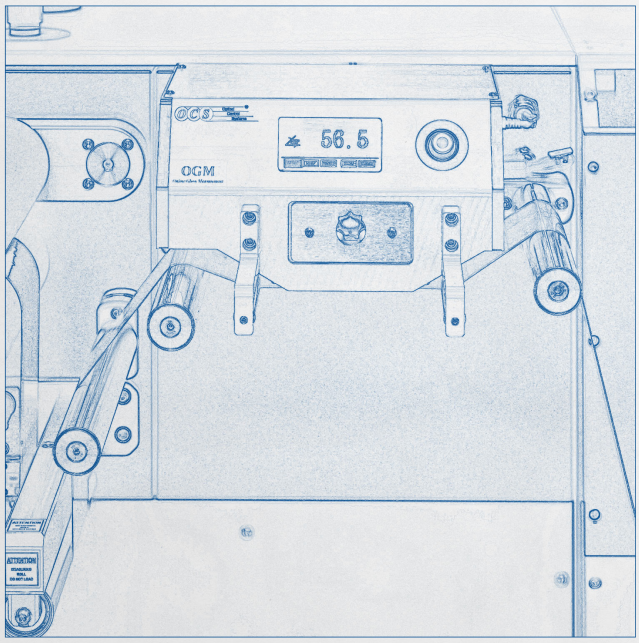
- OCS Modular Film Analyser (MFA)

Technical Details

Measuring area	60°: DIN 67530, 45°: DIN EN 14086, 45°: ASTM D2457 (0–150 GU), area 3 cm
Measuring range	0–200 GU
Indicator resolution	0.1 GU
Averaging	1–50 s
Detector	Silicon photo detector with spectral evaluation
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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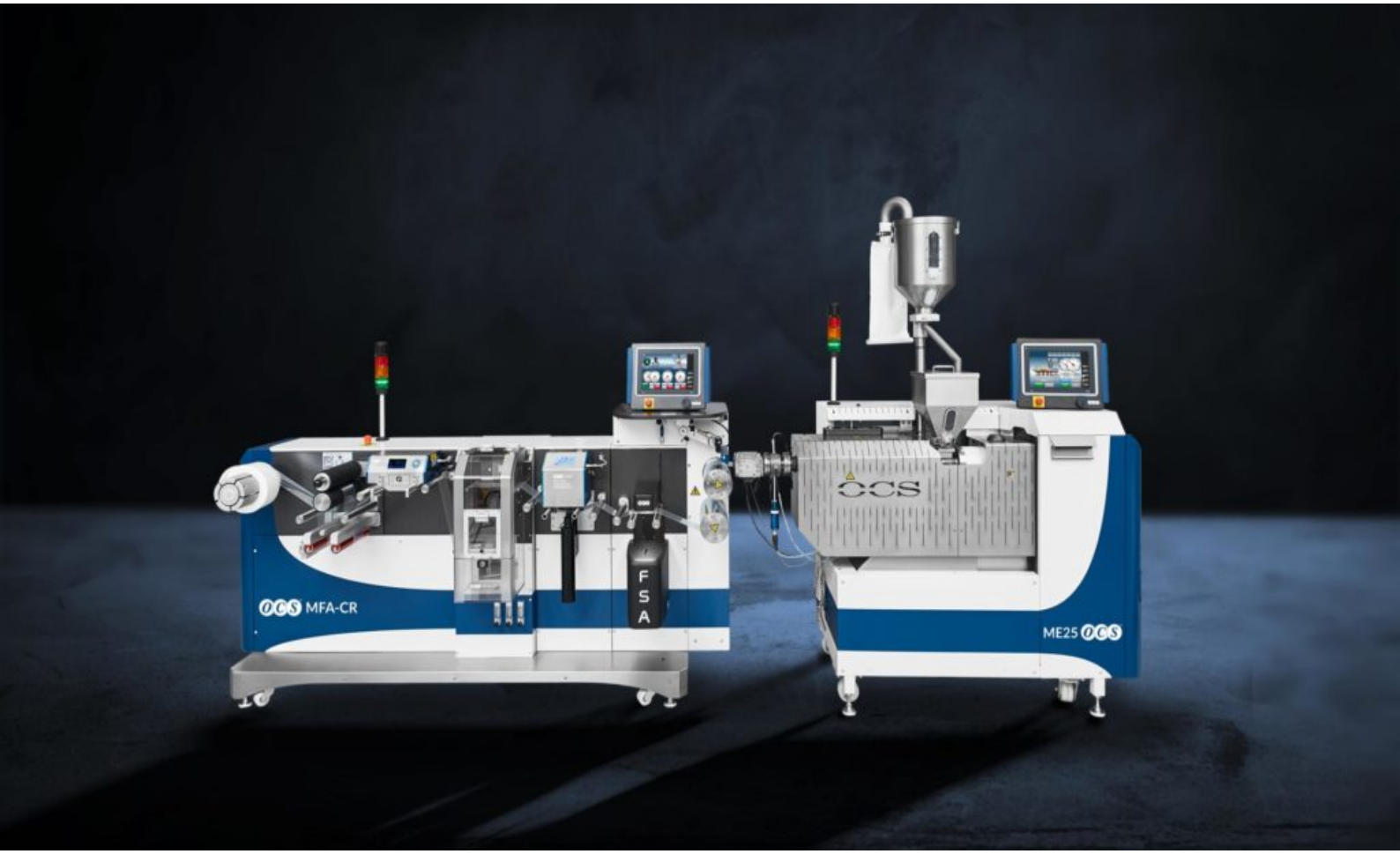

Haze and Transmission Measurement (OHM)

The OCS Haze and Transmission Measurement (OHM) is used for the automated and continuous measurement of the haze properties on polymer film. It additionally determines the transmission average. The measuring instrument is integrated into the Modular Film Analyser (MFA) or can be used as a stand-alone version (tabletop unit).

Features

- Continuous haze and transmission measurement according to ASTM D 1003
- Simple multi-point calibration

Compatible with

- OCS Cast Film Line
- OCS Blown Film Line
- OCS Modular Film Analyser (MFA)

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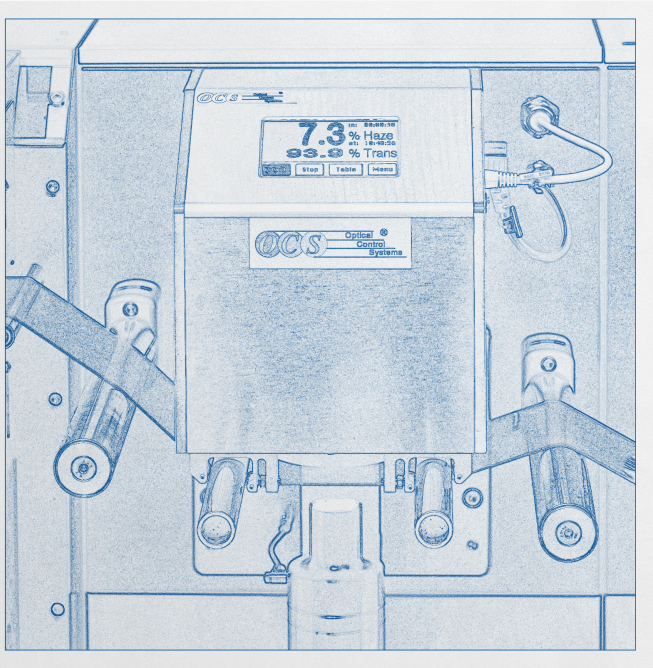
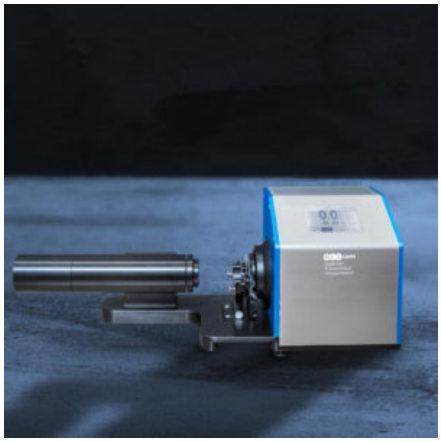
Technical Details

Measurement range haze	0–100%
Mesurement range transmission	0–100%
Accuracy	+/– 0,2%
Measured area diameter	Ø 22 mm
Spectral adaptation	CIE standard spectral value function V (λ) under standard light type C
Communication protocol	MODBUS/TCP





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Volumetric Resistance Measurement (VRM)

The Volumetric Resistance Measurement (VRM) is an optional measurement system for the Modular Film Analyser (MFA). It enables the inline determination of the specific electrical resistance of conductive polymer films. The measurement is performed by means of a movable measuring head in which measuring and compensation electrodes are integrated. Another feature is the easy operation of the Volumetric Resistance Measurement via the touch panel of the MFA.

Testable Materials

- Conductive polymer films (tape)

Features

- Measuring head with several compensation electrodes
- Easy operation via the touch panel of the Modular Film Analyser (MFA)
- Security door (including sensor) for monitoring the measurement unit

Optional

- Customer-specific data preparation and transfer
- Remote control (via communication protocol or digital I/O)

Compatible with

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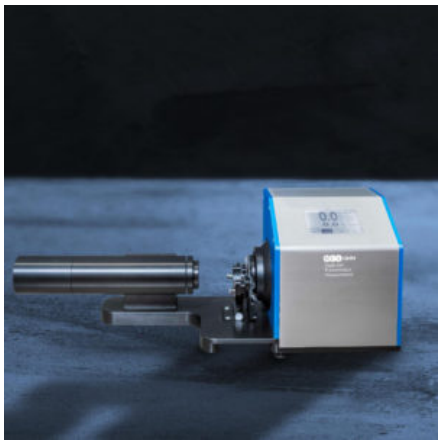
- OCS Tape Line (SSA)
- OCS Modular Film Analyser (MFA)

Technical Details

Measurement range haze	0–100%
Mesurement range transmission	0–100%
Accuracy	+/– 0,2%
Measured area diameter	Ø 22 mm
Spectral adaptation	CIE standard spectral value function V (λ) under standard light type C
Communication protocol	MODBUS/TCP



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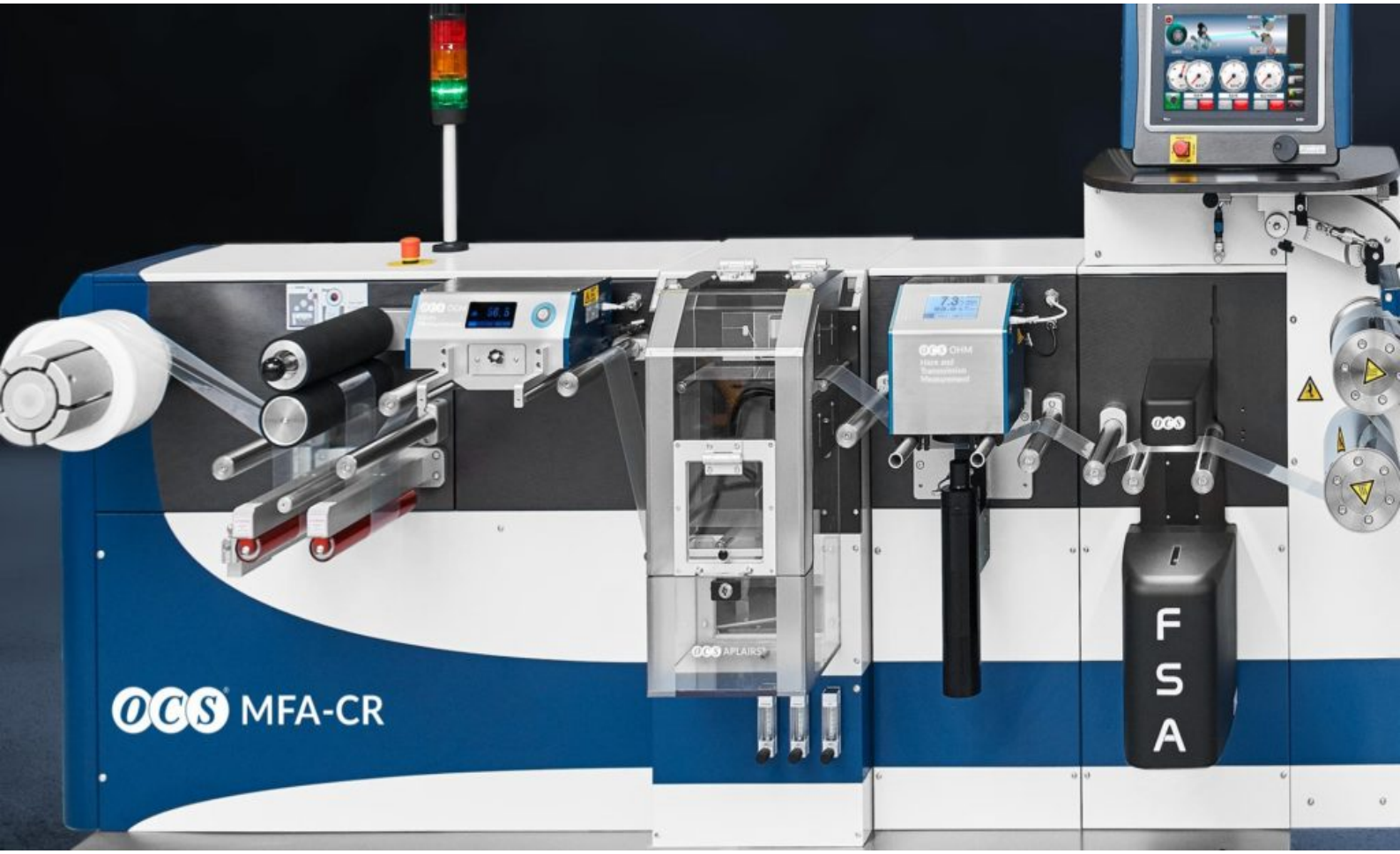

Spectroscopical Measurement APLAIRS®

APLAIRS® (Analysis of Plastics by InfraRed Spectroscopy) is a spectroscopic method for measuring additives, (co-)monomer compositions and chemical and physical properties in the production of polyolefins. This concept allows the automation of the daily continuous measurement requirements for quality control. For this purpose, the polymer film runs through the APLAIRS® system, which is equipped with an FTIR spectrometer and specially developed software.

The measurement takes place in real time. The spectra are recorded and properties are predicted, documented and graphically processed. The results can also be transferred to superordinate systems. This ensures continuous quality control and documentation and the resulting reliable control of various processes. The automated sample preparation leads to personnel savings and significantly reduces labour costs.

Application Areas

- Analysis of materials, such as LDPE, LLDPE, HDPE, PP, ABS, PS, PET, EVA and PC
- Analysis of additives such as antioxidants, lubricants, UV absorbers, stabilisers, fillers, processing aids, etc.
- Testing of physical properties, such as density in polyolefin, thickness, etc.

Features

- Using the software, continuous recording of spectrums and prediction of analysis data (every three minutes)

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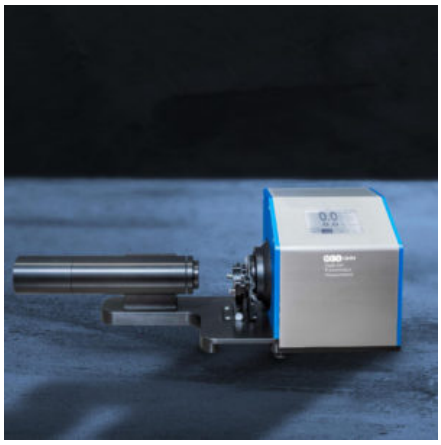
- Robust and precise FTIR spectroscopy
- Conventional as well as multivariate analysis can be applied to predict the analysis data

Compatible with

- OCS Cast Film Line
- OCS Blown Film Line

Technical Details

Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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Label Printer (LP100)

The OCS Label Printer (LP100) ensures the highest quality standards with regard to the labelling of, and repair of defects on, polymer films. Simple operation enables reliable and fast printing.

Labelable Materials

- Polymer films (tape)

Features

- Reliable and fast printing
- Precise impression
- Easy operation
- Compact design
- Meets the highest quality standards

Compatible with

- OCS Tape Line
- OCS Modular Film Analyser (MFA)

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Technical Details

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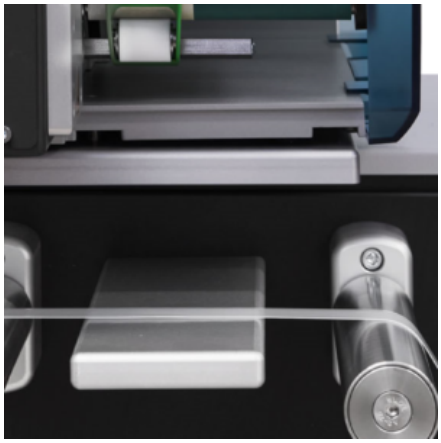

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LASER Marking System (LM100)

The OCS LASER Marking System is designed and manufactured using state-of-the-art technology. The LM100 can be used to mark or label defects on polymer films (tape). The labelling and marking settings as well as the power of the laser can be configured with the operator software to the corresponding product requirements. The LASER Marking System consists of laser, control and suction unit.

The laser unit essentially consists of a class 4 air-cooled laser, a two-part protective cover, a viewing window and a pneumatically swivelling film guide. The laser unit has two air filters so that neither dirt nor dust accumulates inside its CO2 laser.

Markable Materials

- Polymer films (tape)

Features

- Laser unit with class 4 air-cooled CO2 laser
- Two-part protective cover completely encloses the danger area
- Two air filters prevent dirt and dust from accumulating in the laser unit
- LED lighting
- Pneumatically swivelling film guide
- Adjustable movement speed of the swivel arms
- Viewing window on the laser unit

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- Operator software with a wide range of labelling and marking settings

Compatible with

- OCS Tape Line
- OCS Modular Film Analyser (MFA)

Technical Details

Wavelength of the laser	10.6 µm

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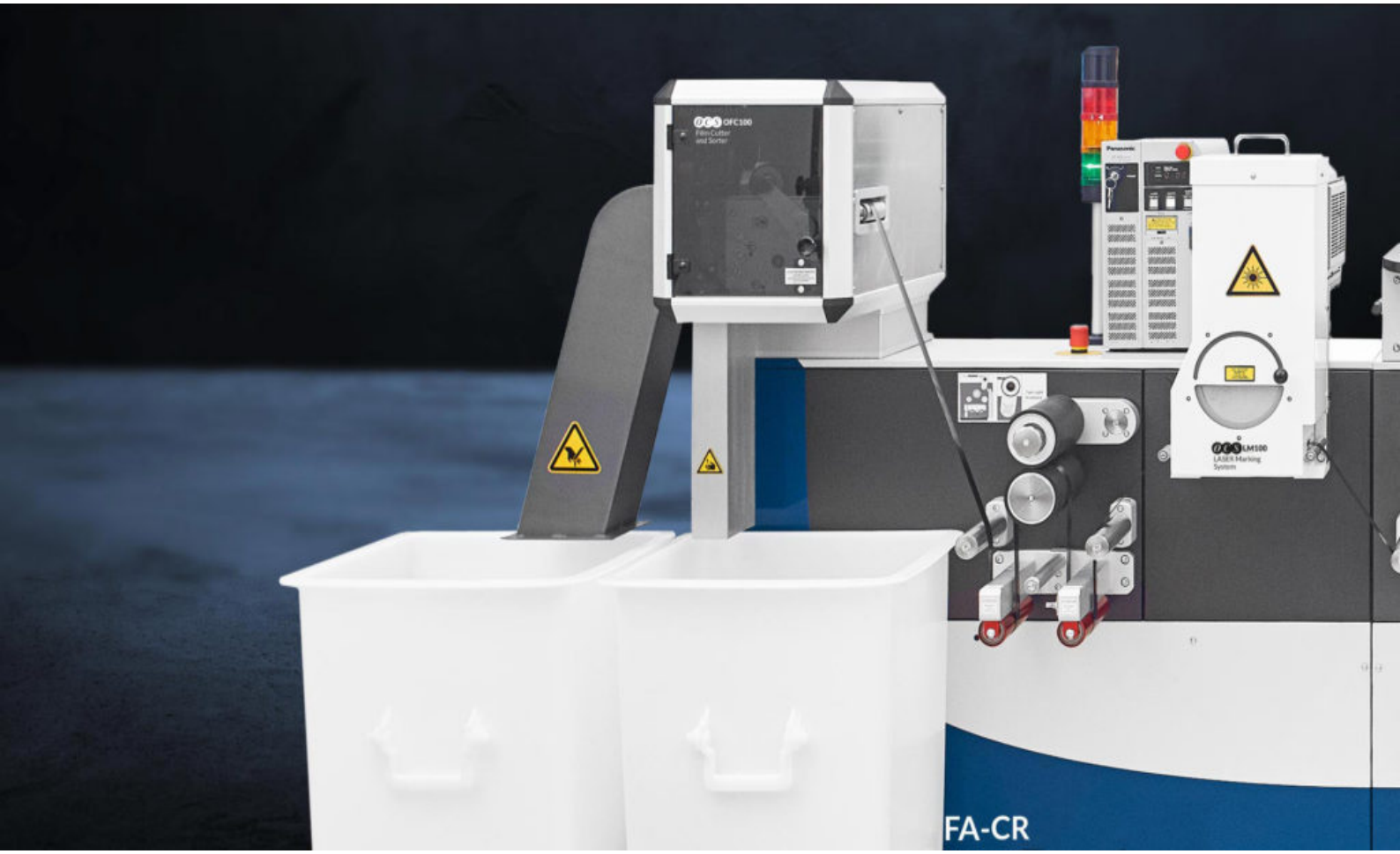

Film Cutter and Sorter (OFC100)

The OCS Film Cutter and Sorter (OFC100) performs two tasks in one system. First, it continuously shreds the polymer film into sections of consistant length (specified value) and ejects them. The ejected film cuttings are then collected in a collection container. The OFC100 automatically sorts out the marked and contaminated film sections with the help of the software. These marked sections are significantly longer for purposes of further analysis and are ejected separately via the sorting ejector into another collection container. Here, too, the length of the marked film sections can be defined.

Cuttable and Sortable Materials

- Polymer films (tape)

Features

- Automated cutting and sorting unit
- Consistent and definable section length
- Working width of up to 100 mm
- Material thickness of 500 µm
- Automatic sorting of the contaminated/non-contaminated strips into the respective collection container
- Cutting unit completely enclosed and locked by safety circuit and electrical door interlock

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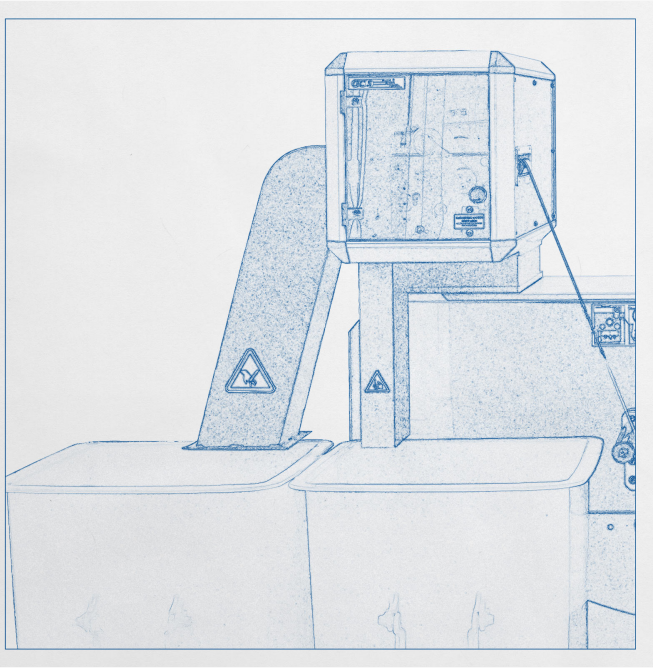
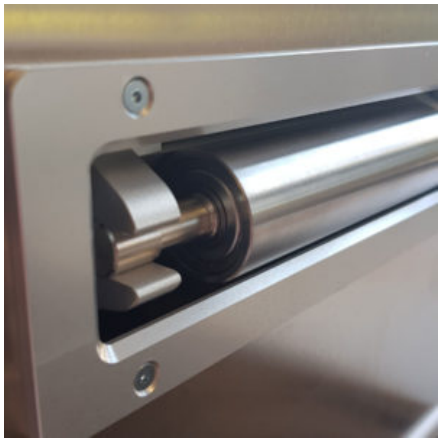
Compatible with

- OCS Tape Line
- OCS Modular Film Analyser (MFA)

Technical Details

Working width	Up to 100 mm
Max. material thickness	500 µm





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Film Surface Analyser (FSA100V2/FSA200V2)

The OCS Film Surface Analyser (FSA100V2/FSA200V2) is a modular optoelectronic inspection system for polymer films. It can be used in the laboratory as well as in the running production process. The film is inspected by means of a high-resolution CMOS line camera and a user-specific, high-power LED. This combination enables optimal defect detection in transparent, opaque and coloured polymer films. In the FSA100 software, the measurement results are analysed according to user-specific requirements, defects are classified and the film quality is determined. The FSA100V2 can be combined with other OCS film inspection systems, such as the X-Ray Tape Analyser (XTA100). This combination provides additional measurement results, which allow even more extensive analysis of the defects. Furthermore, multiple FSA100V2 systems can be used on one OCS film line to perform different inspection tasks simultaneously, such as reflection and transmission measurement.

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Testable Materials

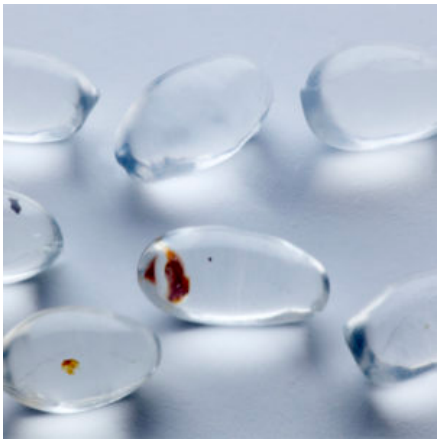
- Polymer films

Features

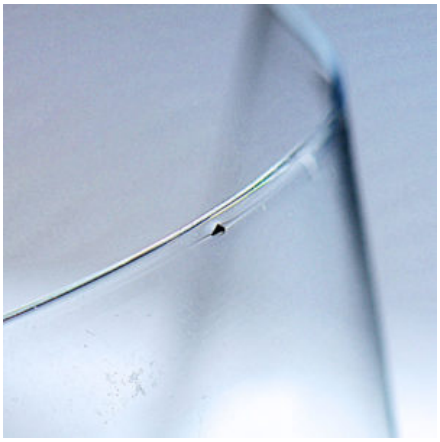
- Modular structure for simple and quick adaptation to customer-specific requirements
- Customer-specific lighting technology such as MCE lighting (Multi Channel Evaluation)
- Real-time error analysis with customer-specific presentation of results
- Transparency measurement

Compatible with

- OCS Cast Film Line
- OCS Blown Film Line
- OCS Tape Line



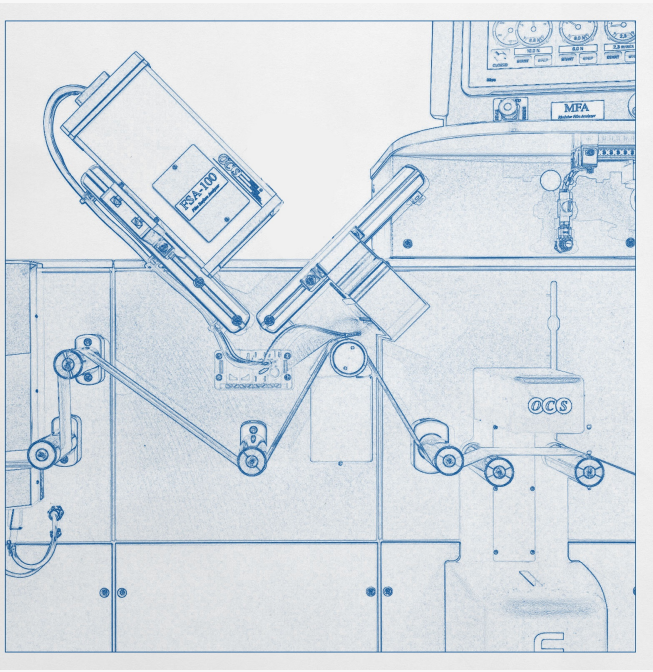
Testable pellets/polymers with defects

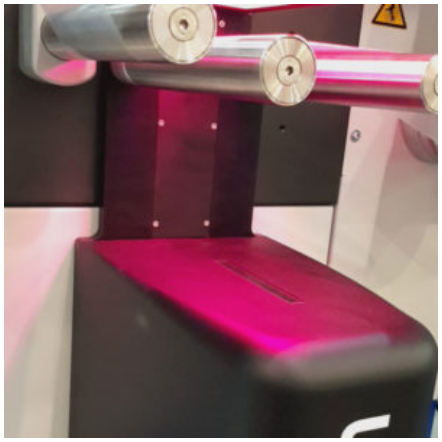


Extruded polymerfilm with visible defects

Technical Details

Camera	3CMOS line scan camera
Resolution	from 5 µm (25 - 50 µm standard resolution)
Lighting	LED
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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External Film Surface Analyser (FSA100EXT)

The OCS External Film Surface Analyser (FSA100EXT) is an optoelectronic inspection system for polymer films. It has been specially designed for implementation in OCS external (laboratory) extrusion lines. The considerable advantage of the FSA100EXT is the customised frame with state-of-the-art camera technology, which fits perfectly into the overall design of the existing line.

The advanced V2 camera technology consists of a high-resolution dual-line CMOS camera and a user-specific high-performance LED. This combination enables optimal defect detection in transparent, opaque and coloured polymer films. In the FSA100 software, the measurement results are analysed according to customer-specific specifications and the defects are classified, which provides information about the film quality.

Testable Materials

- Polymer films

Features

- Tailor-made frame for simple and quick adaptation to customer-specific requirements
- Space-saving unit through the use of flat cables
- Customer-specific lighting technology such as MCE (Multi Channel Evaluation)
- Real-time error analysis with customer-specific presentation of results
- Transparency measurement

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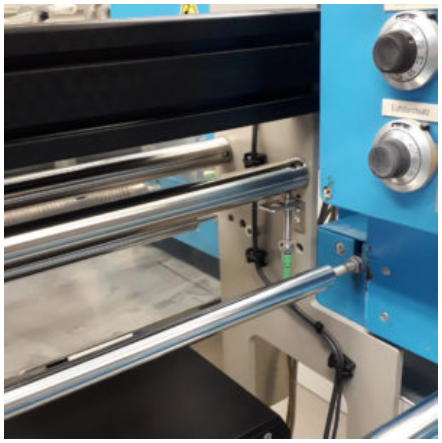
- One-time calibration according to customer specifications by OCS

Compatible with

- All OCS external (laboratory) extrusion lines

Technical Details

Inspection width	175 mm
Camera	Dual-Line CMOS camera (black white)
Resolution	20 µm, 25 µm or 50 µm standard resolution
Lighting	LED
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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Surface Quality Analyser (SQA100)

The OCS Surface Quality Analyser (SQA100) is specially designed to detect irregularities on the surface (pips) of polymer films (tape) in the wire and cable industry. The high-resolution CMOS camera system measures the height of the pips with a resolution of 1 µm using a special measuring method. Additionally, the base diameter and the diameter at half the height of the pips are measured with a resolution of 10 µm. The SQA100 software allows the user to define height and diameter classes and classify the measured pips accordingly. All relevant measurement results are clearly displayed and can be exported to all common file formats.

Testable Materials

- Non-transparent polymer films (tape)

Features

- High-resolution CMOS camera system
- LED lighting
- Real-time error analysis with customer-specific presentation of results

Compatible with

- OCS Tape Line (SSA)

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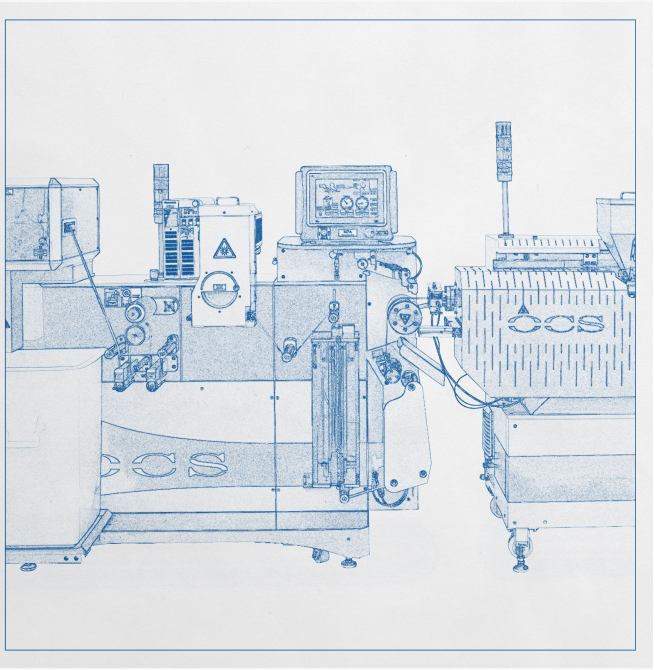
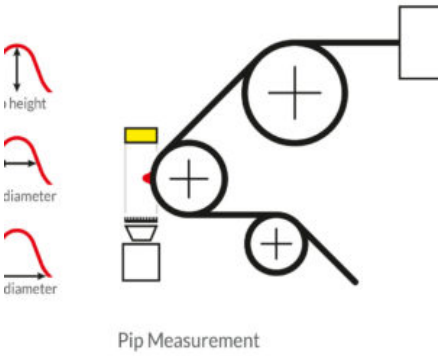
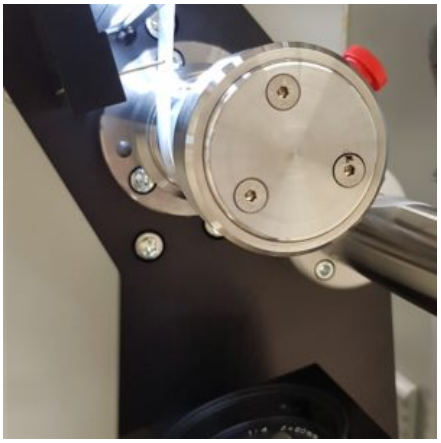
Technical Details

Camera	CMOS camera
Resolution	1 µm for measuring the height of the pips
	10 µm resolution for measuring the base diameter and the diameter at half height
Lighting	LED
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





Pip Measurement



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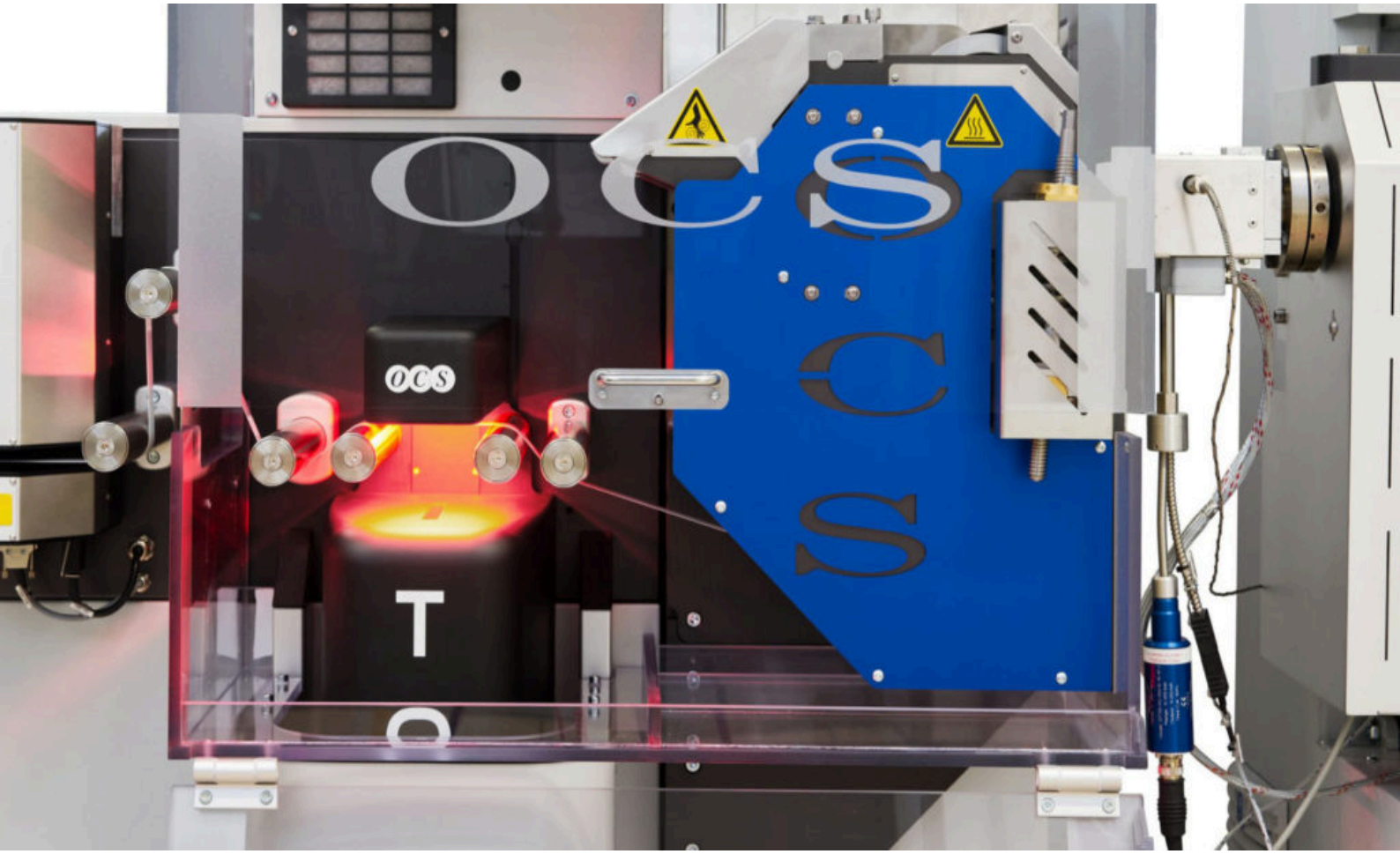

Tape Quality Analyser (TQA100)

The OCS Tape Quality Analyser (TQA100) is used for testing transparent materials (tape) in the wire and cable industry. The high-resolution camera system with a resolution of up to 5 µm and OCS-developed LED illumination with MCE technology (Multi Channel Evaluation) detects impurities such as black specks, fibres and metal particles. With the use of the MCE technology, the system can be adapted to customer-specific requirements and thus further optimise the quality of contamination detection. In the TQA100 software, the measurement results are analysed according to customer-specific presentation of results and defects are classified. All relevant measurement results are clearly displayed and can be exported to all common file formats.

Testable Materials

- Transparent polymer films (tape)

Features

- High-resolution CMOS camera system with a resolution of up to 5 µm
- Customer-specific illumination with MCE lighting (Multi Channel Evaluation)
- Real-time error analysis with customer-specific presentation of results

Compatible with

- OCS Tape Line (TCA)

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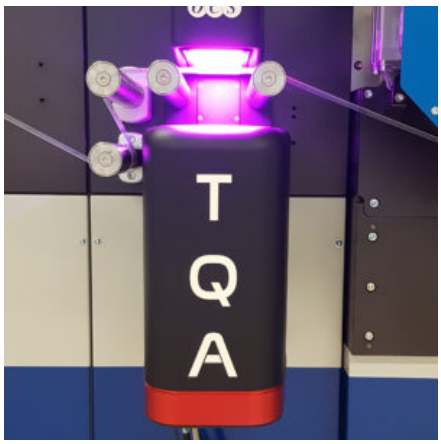
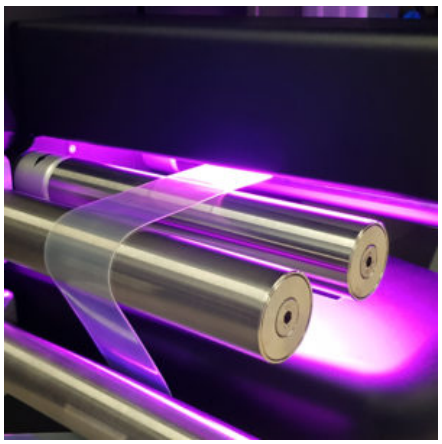
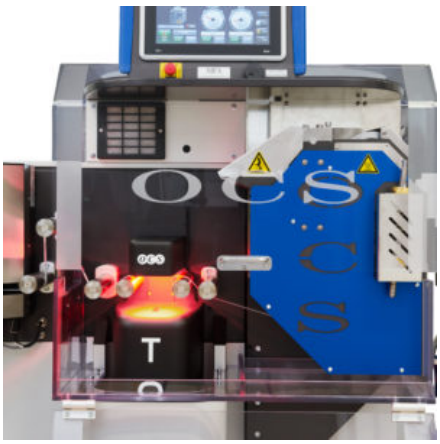
- OCS Modular Film Analyser (MFA)

Technical Details

Camera	3CMOS line scan camera
Resolution	Up to 5 µm
Lighting	LED
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific







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X-Ray Tape Analyser (XTA100)

The OCS X-ray Tape Analyser (XTA100) is an X-ray-based inspection system for polymer films. It was specially developed for the cable and wire industry and enables the specific detection of metal particles. The film is inspected using a high-resolution X-ray camera system. The measurement results are analysed by the XTA100 software according to customer-specific requirements, and defects are classified. All relevant measurement results are clearly displayed and can be exported to all common file formats. The XTA100 can be combined with other OCS film inspection systems, such as the TQA100. This combination provides additional measurement results that allow an even more extensive analysis of the defects.

Testable Raw Materials

- Polymer films (tape)

Features

- High-resolution X-ray camera system
- High-quality and proven radiation protection
- Easy operation due to sliding housing
- Real-time error analysis with customer-specific presentation of results

Compatible with

- OCS Tape Line
- OCS Modular Film Analyser (MFA)

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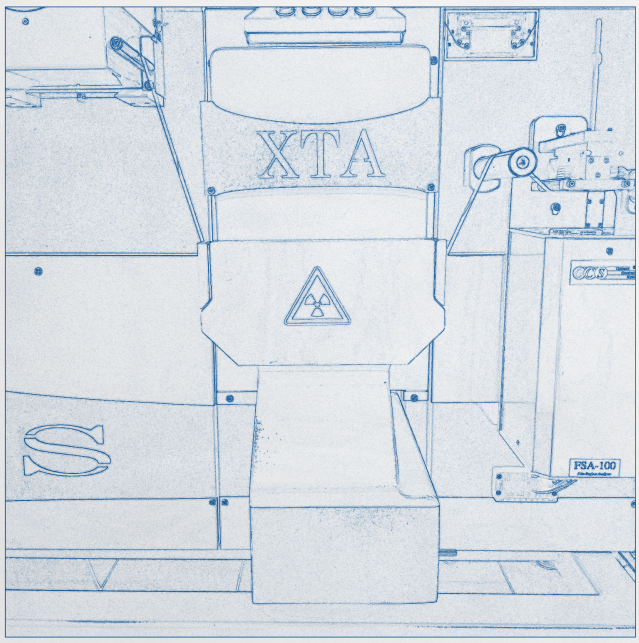
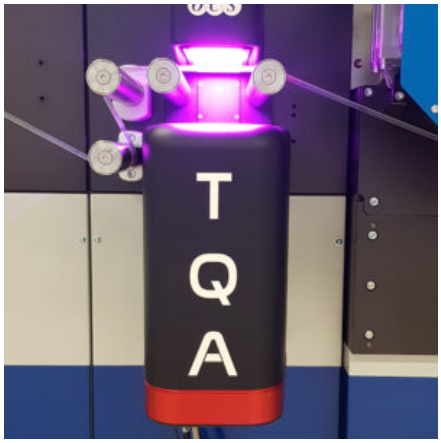
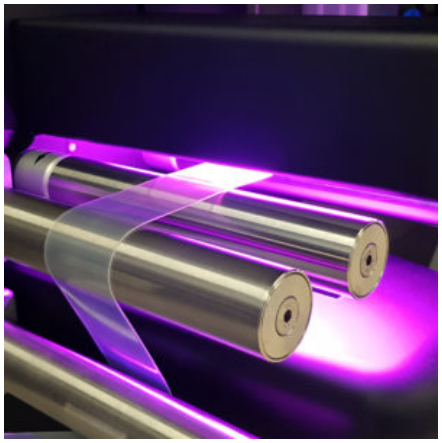
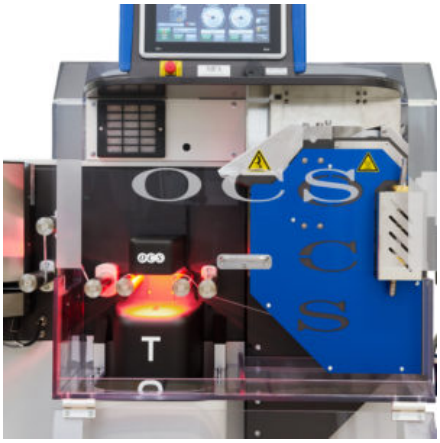
Technical Details

Camera	X-ray line camera
Resolution	From 20 µm
X-ray source	X-ray radiation
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific
Radiation protection measures	Fully enclosed radiation protection housing; In operation measured dose rate lower than background level; Redundant guard controls with active guard locking; Redundant optical warning lights; Key switch to access the x-ray system









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Analysing Container – Complete Online Quality Control Systems

OCS has taken the steadily growing requirements of the processing industry for polymer systems as an opportunity to develop an Analysing Container that fully meets the specific needs of a laboratory. Tailor-made OCS Analysing Containers combine OCS Analysing Systems in a single unit. This combination fulfils comprehensive quality control requirements and enables the early detection and tracing of errors.

Features

- Standardised online concepts for a 'closed loop'
- Constant quality control
- Customised equipment options, for example HVA (heating, ventilation and air conditioning) and other measurement and analysis systems
- Location-independent laboratory

Devices and Systems (Example)

- OCS Line (Cast Film or Tape)
- OCS Pellet Analysing System (PA66)
- OCS Melt Flow Measurement System (OP5)
- OCS Pellet Transport System (PTS)

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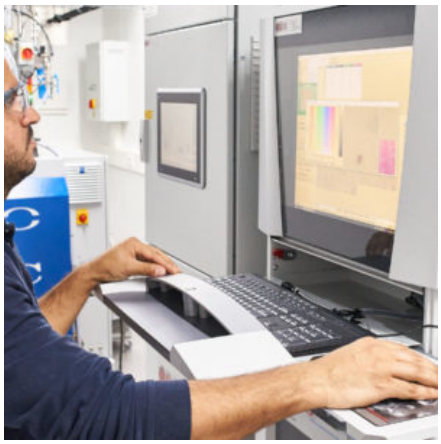
Take a Look Inside

Video shows possible equipment that can be included in an Analysing Container and gives you insight into the diverse application and testing options for the flexible test lines.

[vc_video link="https://youtu.be/hU7DexA3lkk"]

Technical Details

Camera	X-ray line camera
Resolution	From 20 µm
X-ray source	X-ray radiation
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific
Radiation protection measures	Fully enclosed radiation protection housing; In operation measured dose rate lower than background level; Redundant guard controls with active guard locking; Redundant optical warning lights; Key switch to access the x-ray system



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Pellet Transport System (PTS)

The OCS Pellet Transport System (PTS) is a control system that ensures the continuous and automatic transport of plastic granules (pellets) between production lines and measuring systems. The pellets from the production line are removed by pneumatic samplers. The samples are transported through special conveyor pipes, distributed and fed to the corresponding measuring system. This ensures a gentle transport of the pellets to avoid dust and streamers.

Features

- Individual and fully automated transport system for supplying the measuring systems
- Enables timely readjustment in case of parameter variations (minimisation of scrap)
- Simple operation via touch panel with optical and acoustic alarm functions
- Optimised transport speed for every application

Compatible with

- All OCS Equipment

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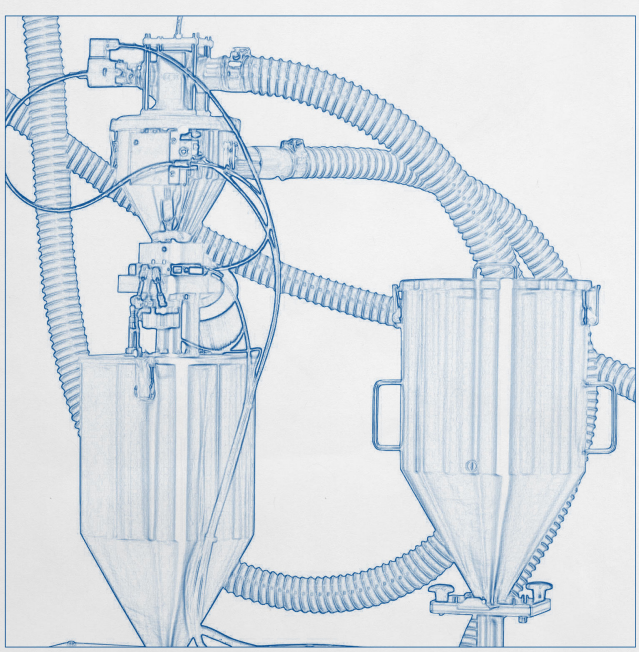
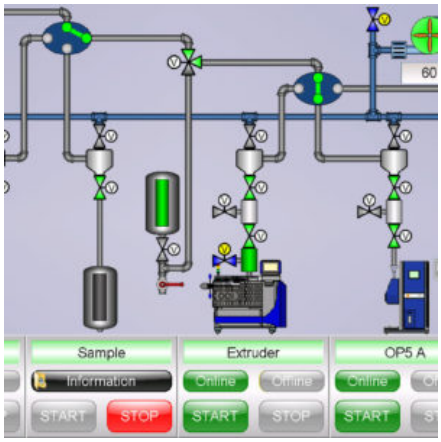
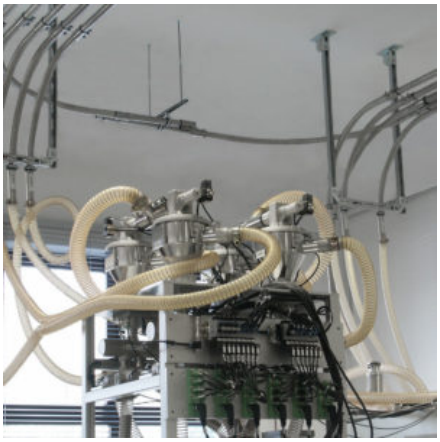
Technical Details

Transportation distance	Standard up to 250 m (larger distances depending on product/application)







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X-Ray Pellet Scanner (XP7)

The new OCS XP7 X-Ray Pellet Scanner detects metal defects in highly transparent and opaque pellets, which improves the polymer and product quality. The innovative X-ray technology in the measuring system of the XP7 analyses images of the pellet stream in real time. Due to the different absorption of the X-rays in the metal and in the polymer, the embedded metal particles can be detected from a size of 50 µm. Contaminated pellets are sorted out by a multi-track air nozzle system.

Testable Raw Materials

- Highly transparent pellets
- Opaque pellets

Features

- High-resolution X-ray image
- Smallest detectable contamination size: 50 µm
- High-speed throughput rate of up to 600 kg/h depending on pellet properties
- Specially developed for the detection of metal defects in pellets
- High-quality and proven radiation protection
- Visualisation of the real-time results
- Multi-track air nozzle system for sorting out contaminated pellets

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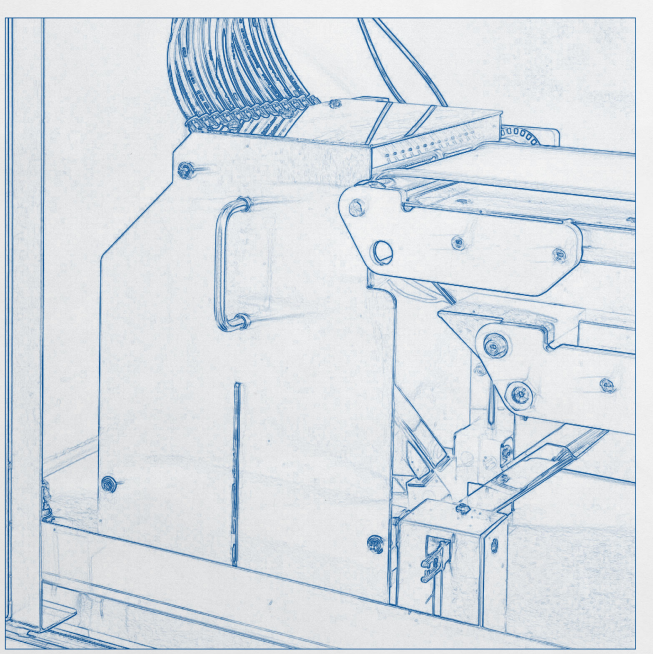
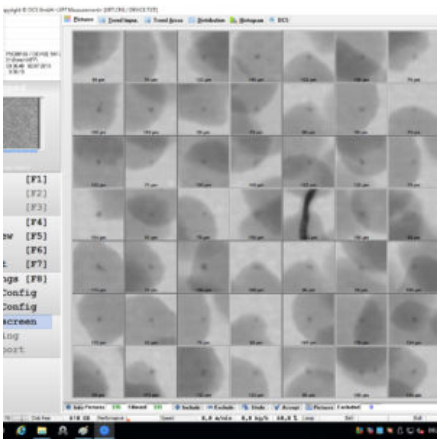
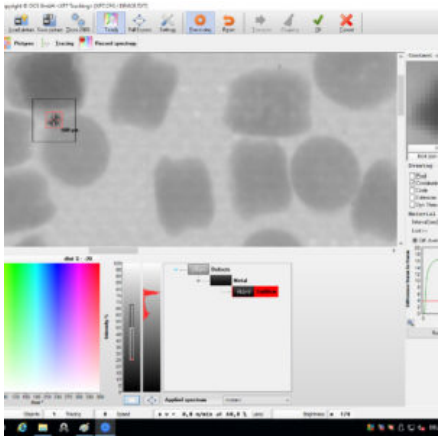
Technical Details

Resolution	50 µm
High-voltage generator	Specification max.: 30 kV, 300 W Operated at: 25 kV, 300 W
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific
Radiation protection measures	Fully enclosed radiation protection housing; In operation measured dose rate lower than background level; Redundant guard controls with active guard locking; Redundant optical warning lights; Key switch to access the x-ray system







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Pellet Scanner (PS800C)

With the OCS Pellet Scanner (PS800C), highly transparent and opaque pellets can be analysed in free fall using two separate colour line scan cameras (inspection of the front and back of the pellet stream). The system detects impurities that show a colour deviation from the product. An additional feature of the PS800C is a multi-track flap system that sorts out the contaminated pellets. The masterbatch concentration can also be determined. Further advantages are the data transfer of real-time results to the production and process control as well as product improvement through the sorting out of contaminated pellets.

Testable Raw Materials

- Highly transparent pellets
- Opaque pellets
- Coloured pellets

Features

- Two high-performance colour line scan cameras
- Smallest detectable contamination size: 50 µm
- High-speed throughput rate of up to 1.200 kg/h depending on pellet properties
- Specially developed for the detection of impurities in highly transparent pellets
- Visualisation of the real-time results
- Multi-track flap system for sorting out contaminated pellets

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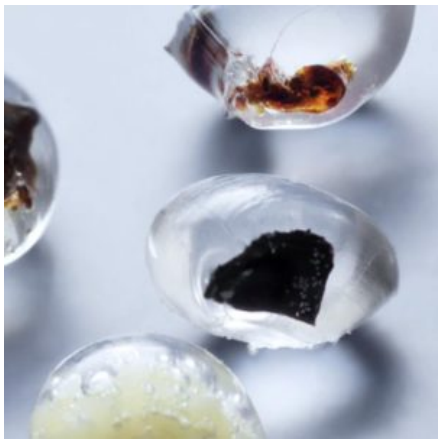
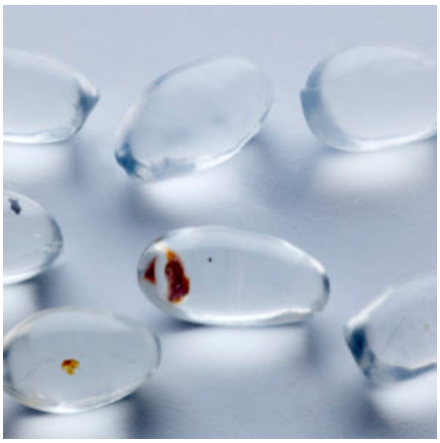
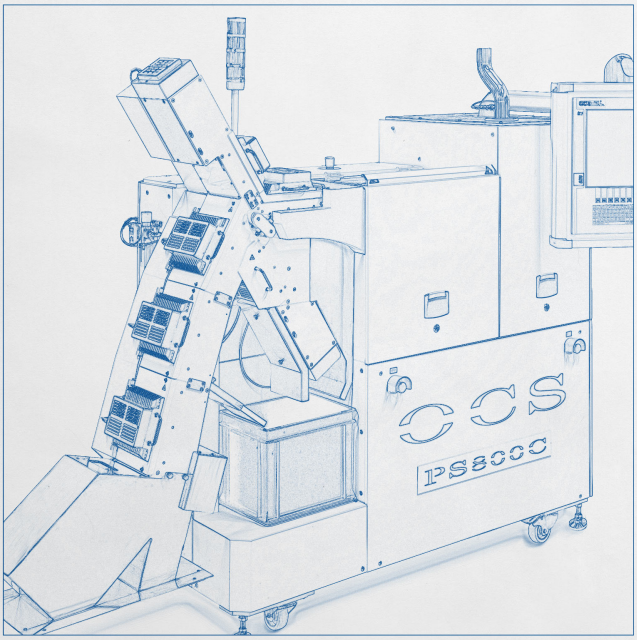
[vc_video link="https://www.youtube.com/watch?v=Kt1b_-wUqGU"]

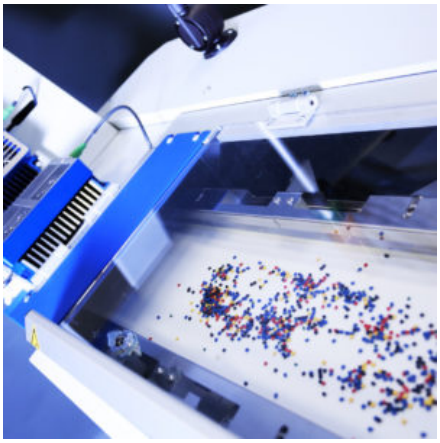




Technical Details

Camera	Two 3CMOS colour line scan cameras
Resolution	50 µm
Lighting	High-power LED white light spectrum
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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Pellet Scanner (PS800C)

With the OCS Pellet Scanner (PS800C), highly transparent and opaque pellets can be analysed in free fall using two separate colour line scan cameras (inspection of the front and back of the pellet stream). The system detects impurities that show a colour deviation from the product. An additional feature of the PS800C is a multi-track flap system that sorts out the contaminated pellets. The masterbatch concentration can also be determined. Further advantages are the data transfer of real-time results to the production and process control as well as product improvement through the sorting out of contaminated pellets.

Testable Raw Materials

- Highly transparent pellets
- Opaque pellets
- Coloured pellets

Features

- Two high-performance colour line scan cameras
- Smallest detectable contamination size: 50 µm
- High-speed throughput rate of up to 1,000 kg/h depending on pellet properties
- Specially developed for the detection of impurities in highly transparent pellets
- Visualisation of the real-time results
- Multi-track flap system for sorting out contaminated pellets

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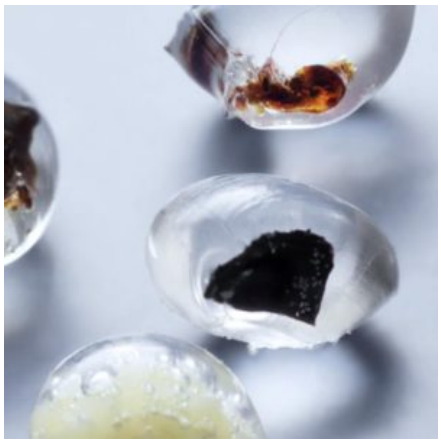
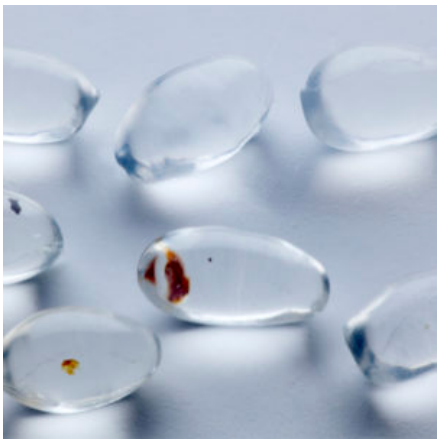
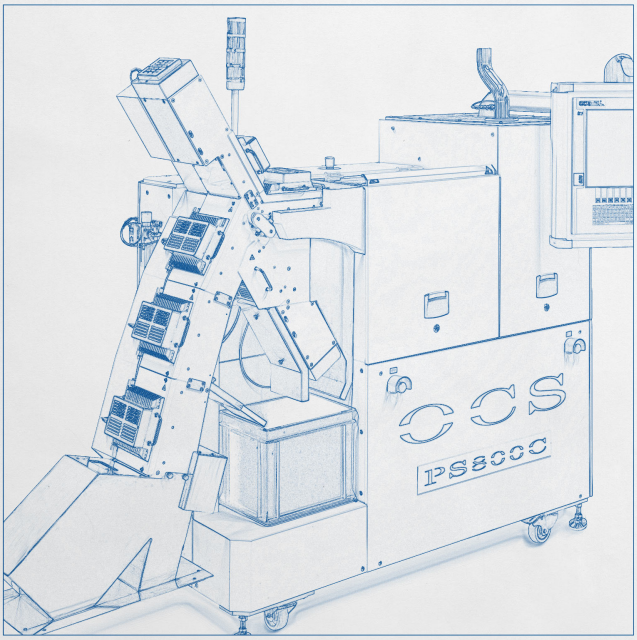
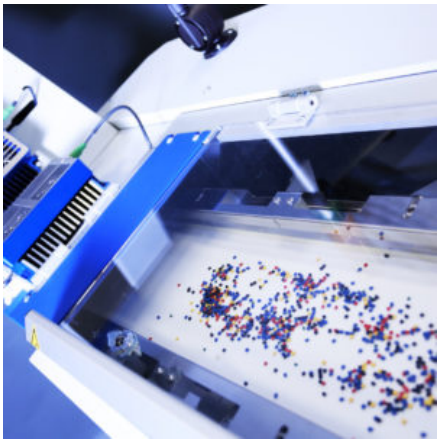




Technical Details

Camera	Two 3CMOS colour line scan cameras
Resolution	50 µm
Lighting	High-power LED white light spectrum
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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Pellet Scanner (PS200C)

The OCS Pellet Scanner (PS200C) can analyse opaque pellets on a rotating plate using of a colour matrix camera. The system detects impurities that show a colour deviation from the product. An additional feature of the PS200C is a multi-track flap system that sorts out the contaminated pellets. Further advantages are the data transfer of real-time results to the production and process control as well as product improvement through the sorting out of contaminated pellets.

Testable Raw Materials

- Opaque pellets

Features

- High-performance 3CMOS colour matrix camera
- Smallest detectable contamination size: 55 µm
- Throughput rate of up to 200 kg/h depending on pellet properties
- Visualisation of the real-time results
- Multi-track suction system for sorting out contaminated pellets

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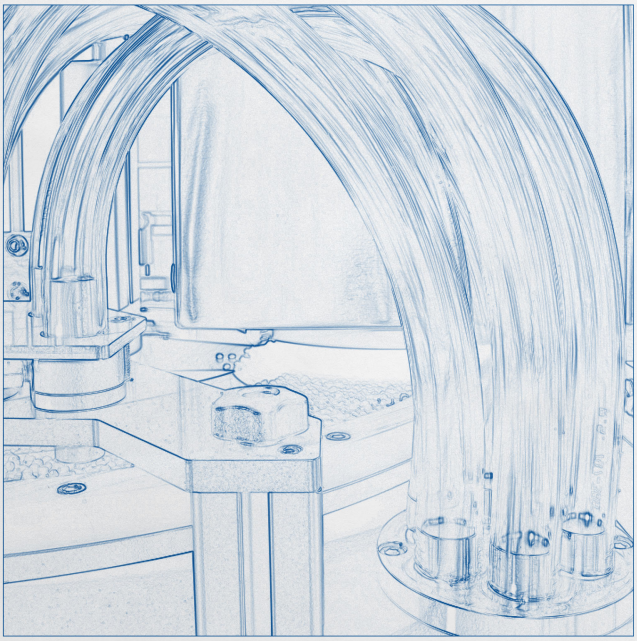
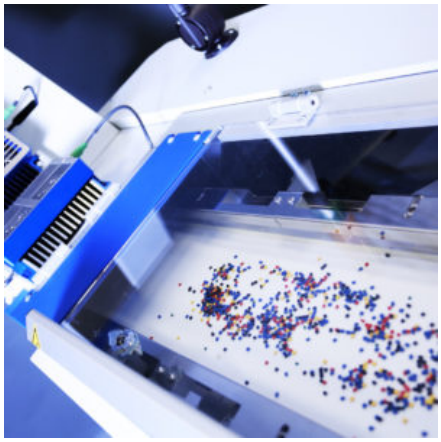
Technical Details

Camera	3CMOS colour line scan camera
Resolution	50 µm
Lighting	High-power LED white light spectrum
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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Pellet Scanner (PS25C)

With the OCS Pellet Scanner (PS25C), highly transparent and opaque pellets can be analysed on a vibration plate using a colour matrix camera. The system detects impurities that show a colour deviation from the product. An additional feature of the PS25C is a multi-track flap system (optional), which sorts out the contaminated pellets. Further advantages are the data transfer of the real-time results to the production and process control as well as the subsequent evaluation of the sorted-out pellets by further analysis systems.

Testable Raw Materials

- Highly transparent pellets
- Opaque pellets

Features

- High-performance 3CMOS colour matrix camera
- Smallest detectable contamination size: 10 µm
- Throughput rate of up to 25 kg/h depending on pellet properties
- Visualisation of the real-time results
- Multi-track flap system for sorting out contaminated pellets

Compatible with

- OCS Colour Measurement (CM3)

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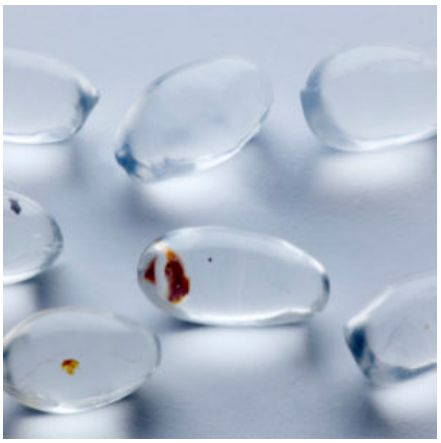
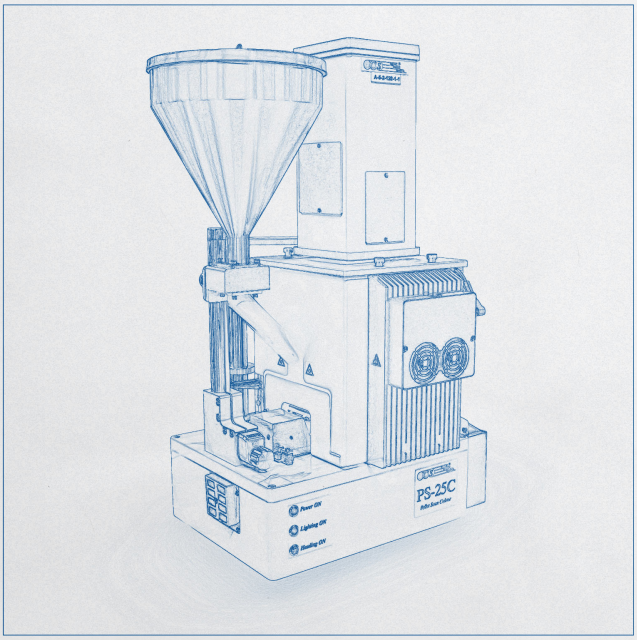
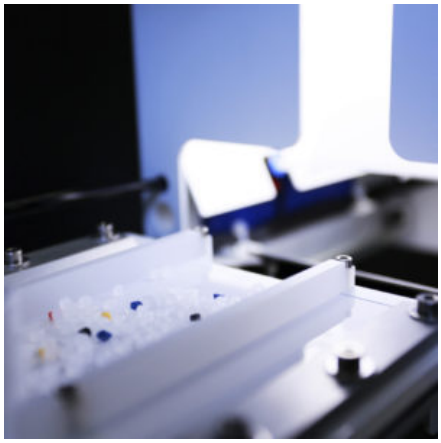
- OCS Pellet Size and Shape Distribution Measurement (PSSD)
- OCS Pellet Transport System (PTS)



Technical Details

Camera	3CMOS colour matrix camera
Resolution	10, 20, 30, 40, 50, 60, 100 µm
Lighting	High-power LED with white light spectrum (optional: UV spectrum)
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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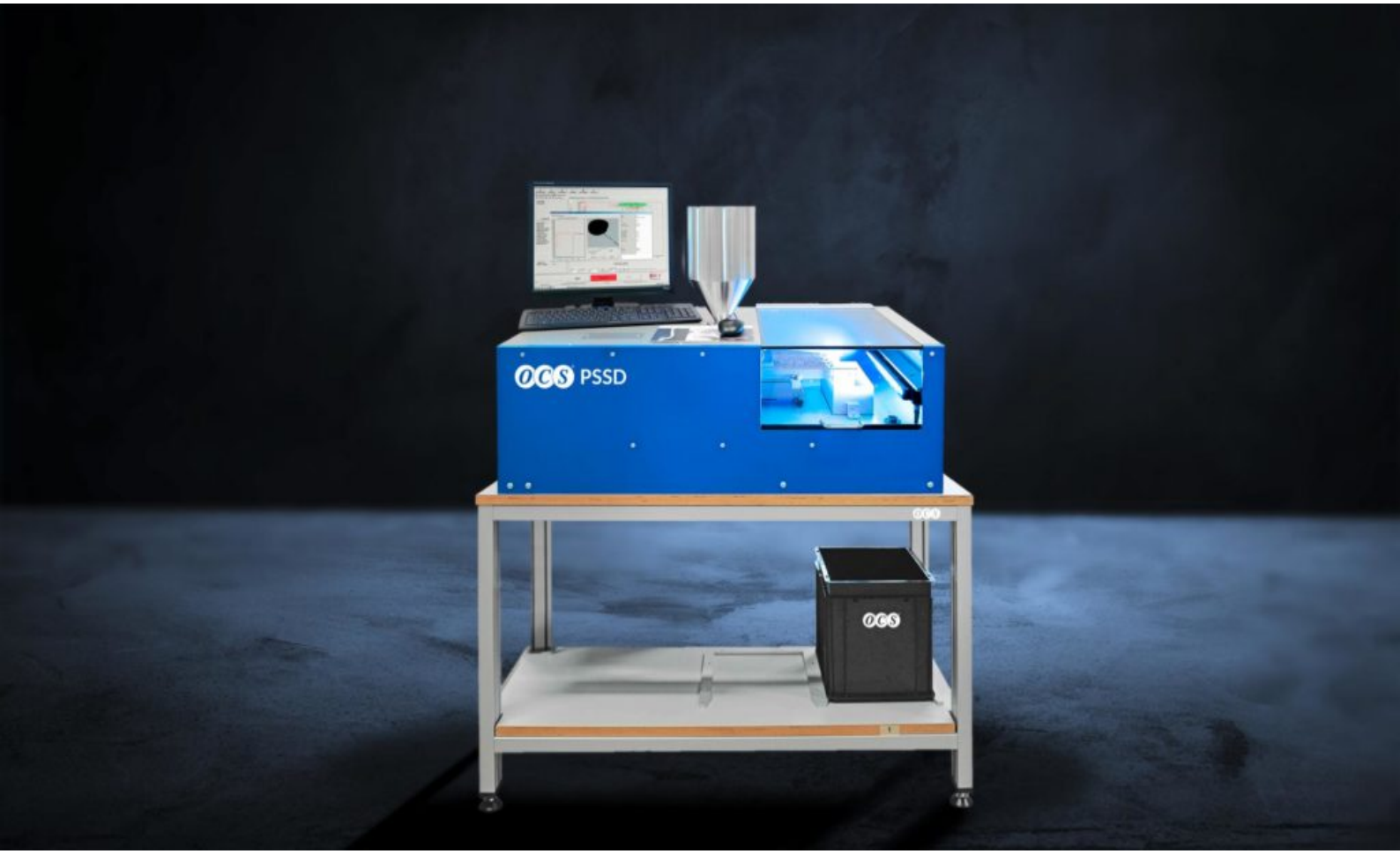

Pellet Size & Shape Distribution Measurement (PSSD)

With the OCS Pellet Size and Shape Distribution System (PSSD), all types of pellets can be analysed in free fall using a line scan camera. The system classifies pellets (over- and undersize, abrasion, agglomerates, etc.) according to their morphological properties. Further special features of the PSSD are the monitoring of the pelleting system (degree of abrasion of the cutters), the determination of the pellet weight (with optional weighing system) and the data transfer of the real-time results to the production and process control.

Testable Raw Materials

- All types of pellets

Features

- High-speed CMOS line scan camera (monochrome)
- Smallest detectable contamination size: 71 µm
- Throughput rate of up to 18 kg/h depending on pellet properties
- Visualisation of the real-time results

Compatible with

- OCS Pellet Scanner (PS25C)

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Technical Details

Camera	CMOS colour matrix camera
Resolution	71 µm
Lighting	High-power LED with white light spectrum
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific

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Colour Measurement (CM3)

With the OCS Colour Measurement (CM3) all types of pellets can be analysed by means of a colour spectrometer in a measuring channel with an inspection glass. The CM3 is usually connected upstream of the Pellet Scanner (PS25C). This scanner determines relevant colour values (Yellowness Index , Whiteness Index , CIE L*a*b*, etc.) based on the recorded colour spectrum.

Testable Raw Materials

- All types of pellets

Features

- Visualisation of real-time results (by means of Pellet Scanner PS25C)

Compatible with

- OCS Pellet Scanner (PS25C)
- OCS Pellet Analysing System (PA66)

Sales Team

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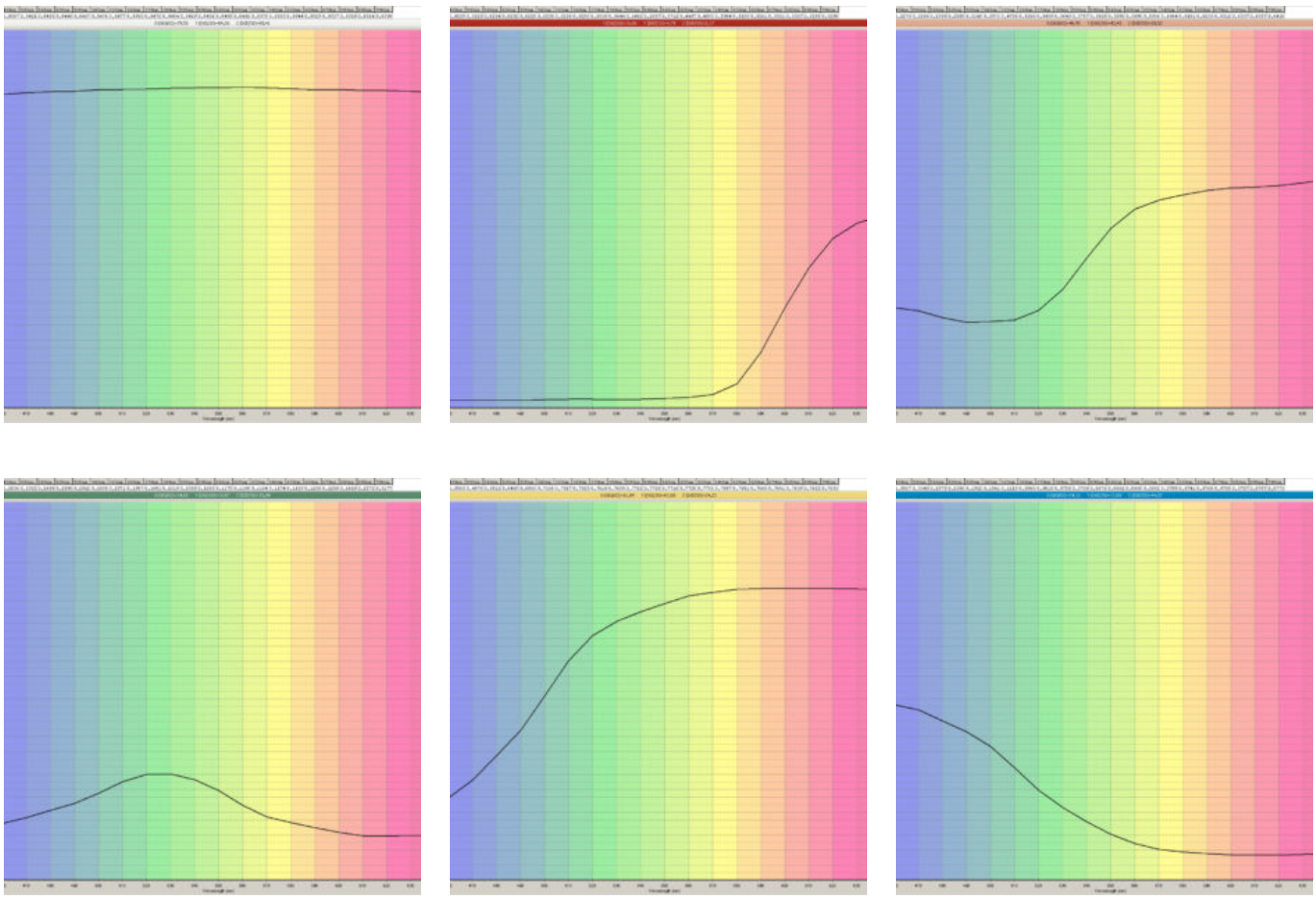
Technical Details

Colour spectrum	400–700 nm
Resolution	10 nm
Lighting	LED
Communication protocol (via Pellet Scanner PS25C)	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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Pellet Analysing System (PA66)

The modular OCS Pellet Analysing System (PA66) consists of the following components:

- The Pellet Scanner (PS25C) detects impurities that show a colour deviation from the product
- The Pellet Size and Shape Distribution Measurement (PSSD) classifies pellets (oversize and undersize, abrasion, agglomerates, etc.) according to their morphological properties
- The Colour Measurement (CM3) measures relevant colour values (Yellowness Index , Whiteness Index , CIE L*a*b*, etc.) based on the recorded colour spectrum (optional)

A further advantage is the data transfer of real-time results to the production and process control.

Testable Raw Materials

- Highly transparent pellets
- Opaque pellets

Includes

- OCS Pellet Scanner (PS25C)
- OCS Pellet Size and Shape Distribution Measurement (PSSD)

Features of the Pellet Scanner (PS25C)

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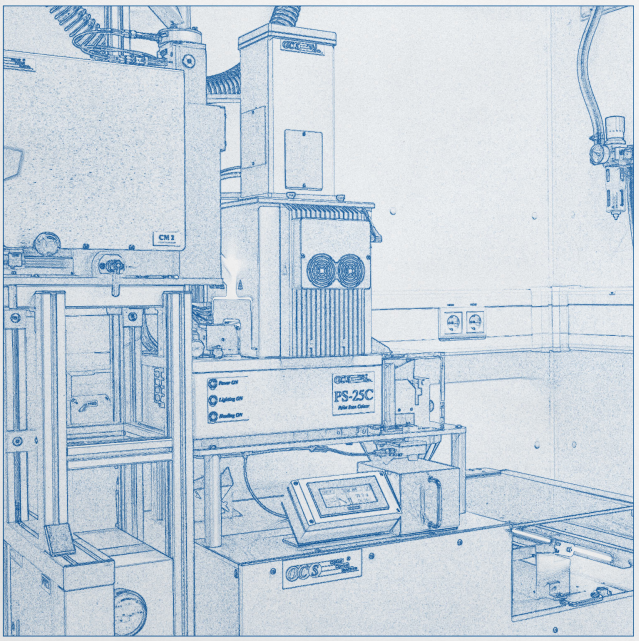
- High-performance 3CMOS colour matrix camera
- Smallest detectable contamination size: 10 µm
- Throughput rate of up to 25 kg/h depending on pellet properties
- Visualisation of the real-time results
- Multi-track flap system for sorting out contaminated pellets (optional)

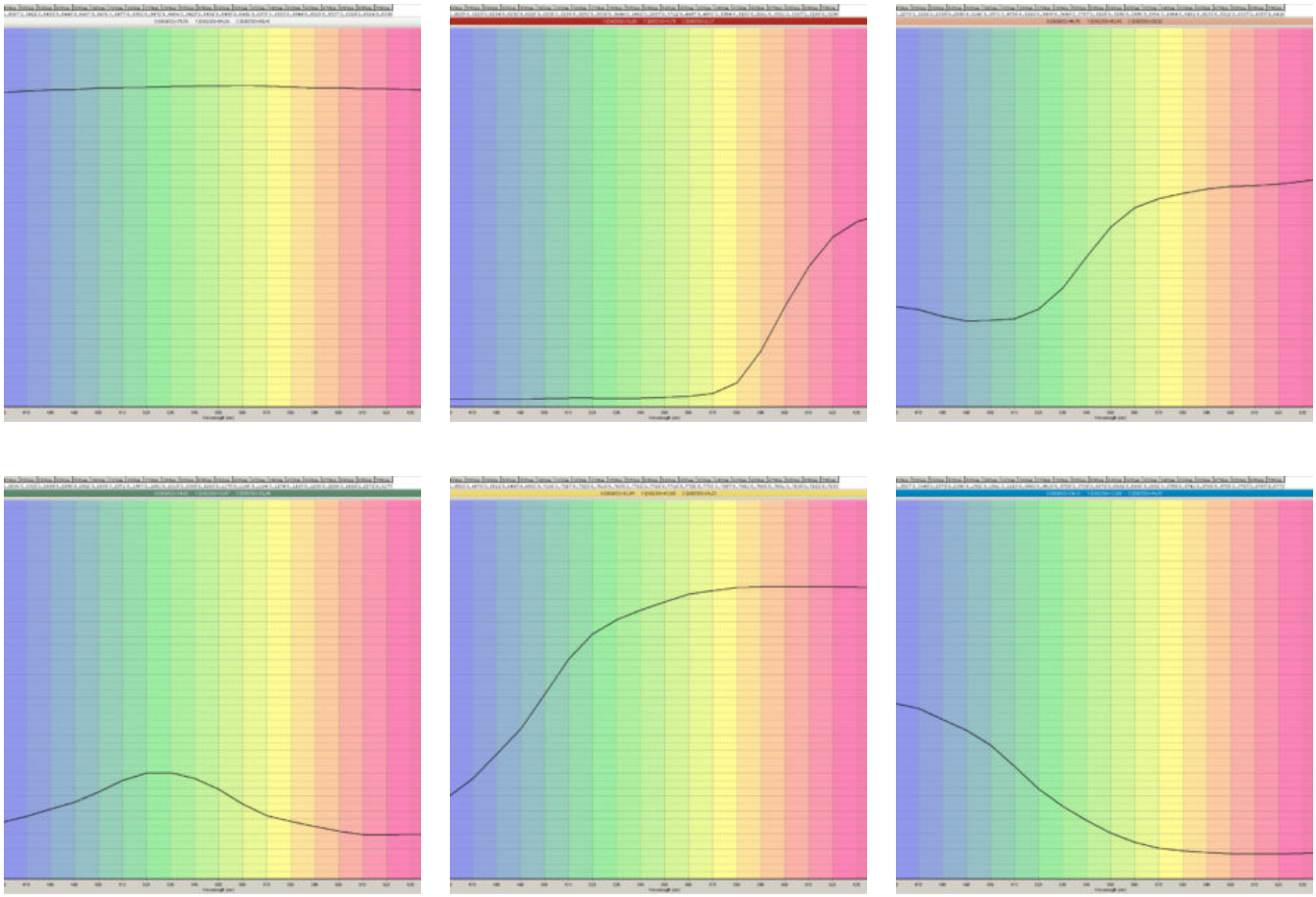
Features of the Pellet Size and Shape Distribution Measurement (PSSD)

- High-performance CMOS line scan camera (monochrome)
- Smallest detectable contamination size: 71 µm
- Throughput rate of up to 18 kg/h depending on pellet properties
- Visualisation of real-time results (using Pellet Scanner PS25C)

Technical Details

Pellet Scanner (PS25C) and Pellet Size and Shape Distribution Measurement (PSSD)	
Camera	PS25C: high-resolution 3CMOS colour matrix camera
	PSSD: high-speed CMOS line scan camera (monochrome)
Resolution	PS25C: 10, 20, 30, 40, 50, 60, 100 µm
	PSSD: 71 µm
Lighting	high-power LED with white light spectrum
Communication protocol (via Pellet Scanner PS25C)	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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Powder Tester (PT2C)

With the OCS Powder Tester (PT2C), powdery materials can be analysed on a vibration plate using a colour matrix camera. The system detects impurities that show a colour deviation from the product. An additional feature of the PT2C is a sorting system (optional) that sorts out the contaminated powder. Further advantages are the data transfer of the real-time results to the production and process control as well as the subsequent evaluation of the sorted-out powder by further analysis systems.

Testable Raw Materials

- Powdery materials (free-flowing)

Features

- High-performance 3CMOS colour matrix camera
- Smallest detectable contamination size: 10 µm
- Throughput rate of up to 1200 g/h depending on the material and resolution
- Visualisation of the real-time results
- Sorting system for sorting out the contaminated powder (optional)

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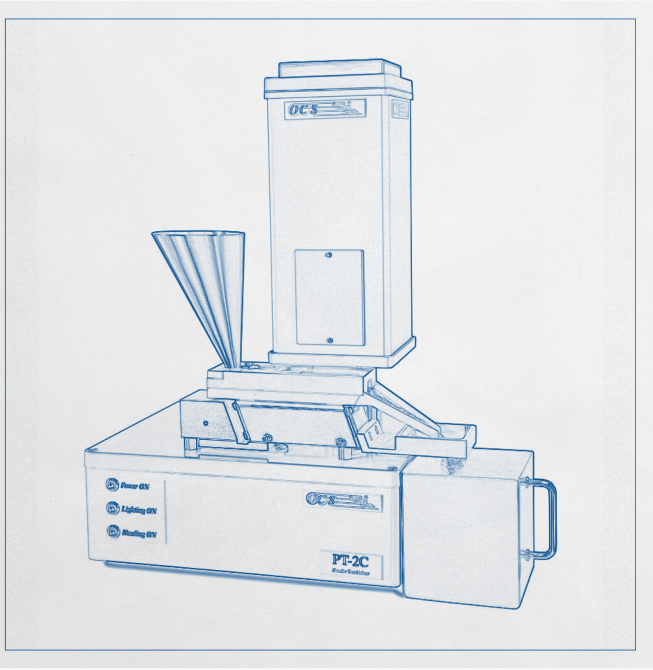
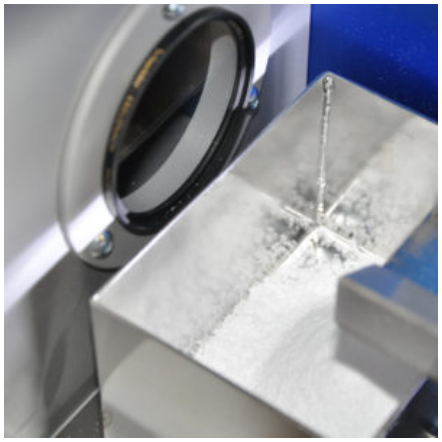
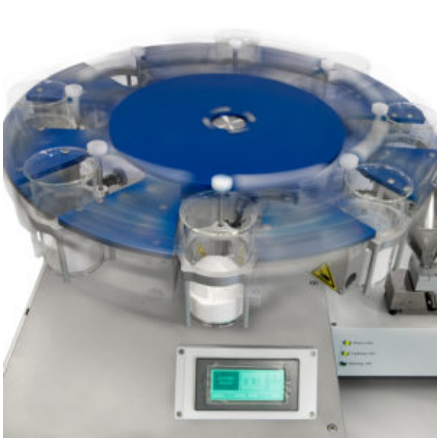
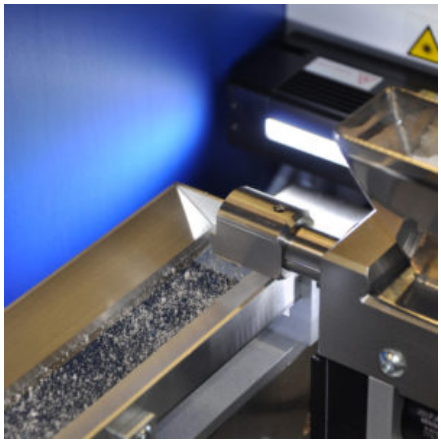
Technical Details

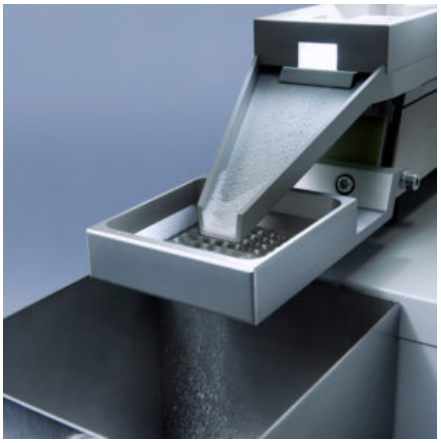
Camera	3CMOS colour matrix camera
Resolution	10 µm
Lighting	High-power LED with white light spectrum
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific











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Liquid Analyser (LA20)

The OCS Liquid Analyser (LA20) is used for optoelectronic inspection of cellulose ethers dissolved in water (e.g. methyl cellulose). This enables the detection of insoluble components. The high-resolution colour area scan camera as well as the high-performance LED lighting are protected by the metal housing against dirt and dust. Special attention was given to the easy cleaning of the flow cell and the optical filters. The special design of the LA20 analysing computer allows a diverse and customer-specific system configuration or expansion. The real-time analysis software allows the operator to configurate the image processing freely. This includes, for example, the detection of contaminants via colour classes or the classification of detected contaminants into freely definable colour, size and shape classes.

Testable materials

- Transparent/translucent liquids

Features

- 3CMOS area scan camera
- Contamination size from 10 µm by inspection of the liquid in transmitted light
- Stable & precisely manufactured metal housing protects against dirt and dust
- Simple disassemblable measuring unit for easy cleaning of the flow cell
- Customer-specific system configuration or expansion
- Visualisation of real-time results

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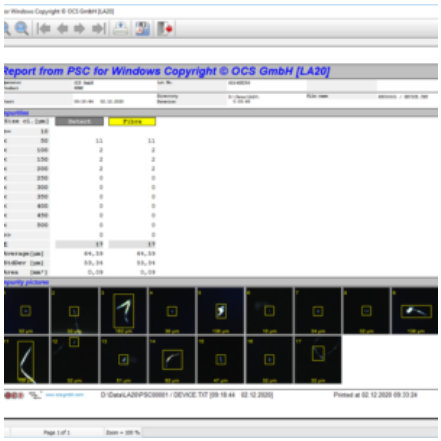
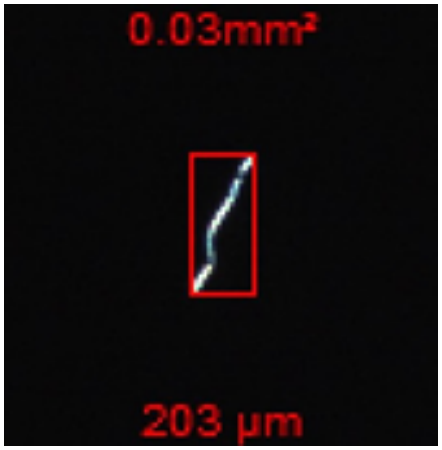
Consisting of

- LA analysing computer
  (incl. screen, keyboard, mouse)
- LA system

Technical Details

Camera	3CMOS area scan camera
Resolution	10 µm (others on request)
Lighting	High-performance LED
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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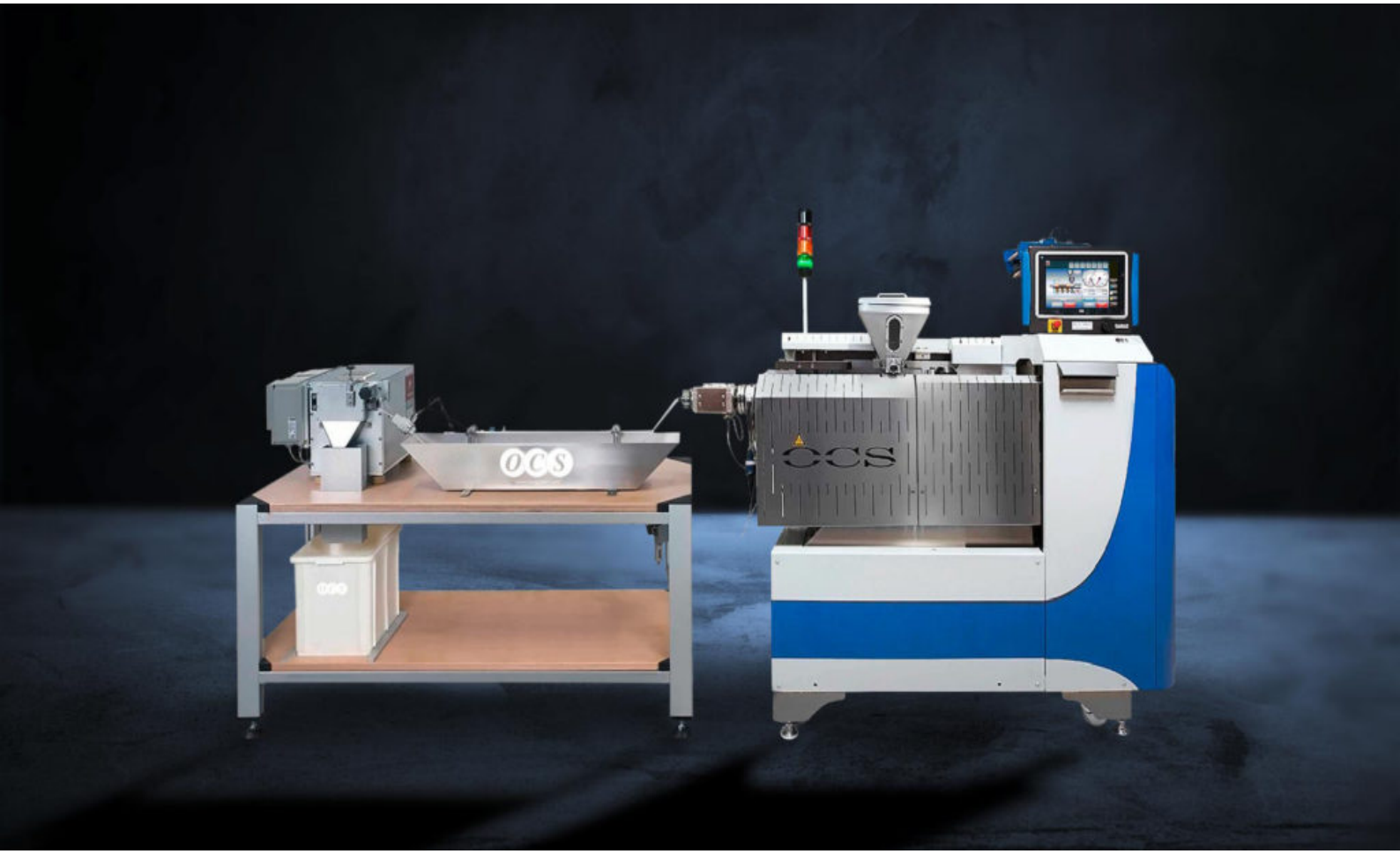

Pelletiser System

The OCS Pelletiser System is used for product development and testing, process simulation and for the small-scale production of polymers with modified quality characteristics. A special feature of the pelletising system is the variable adjustment possibilities for the different compression ratios and mixing zones. Extrusion, cooling, drying and pelletising are combined in one OCS system to enable constant and continuous pelletising.

For this purpose, the material mixture is first fed into the OCS Measuring Extruder (ME) via the feed hopper, producing the required strand. This strand is finally cooled in a water bath, dried by means of a compressed air nozzle and cut into pellets. In this way, new recipes such as additive matrices and masterbatch compounds can be provided quickly and easily for further pellet analysis.

Testable Raw Materials

- Pellets, compounds and masterbatch

Features

- Monitoring of the process data via the Touch Panel of the OCS Measuring Extruder (ME)
- Setting of options for different compaction ratios and mixing zones
- Strand cutting plate with 1 or 2 outlets of from 3 to 6 mm
- Stainless steel water bath with compressed air nozzle for drying
- Pelleting unit with adjustable speed and pellet collector

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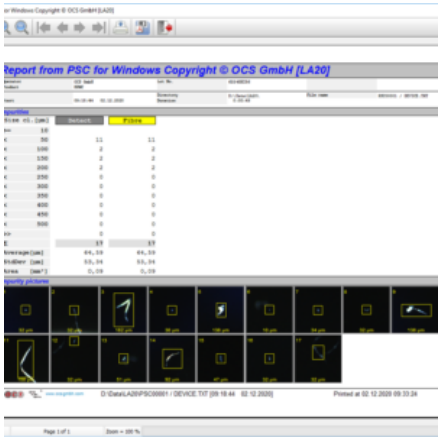
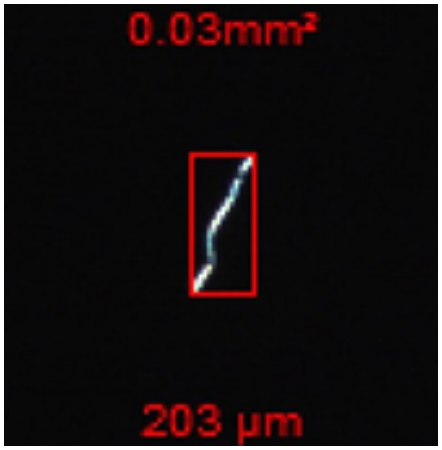
[vc_video link="https://youtu.be/9KH3njUxOmk"]

Technical Details

Camera	3CMOS area scan camera
Resolution	10 µm (others on request)
Lighting	High-performance LED
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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Sample Tester (ST4)

The OCS Sample Tester (ST4) is a compact tabletop unit for the optical analysis of transparent and non-transparent surfaces, such as plastics, steel, paper, textiles and non-wovens, for irregularities and contamination. It is used in the laboratories of manufacturing companies as well as in research and development centres. The system can operate in reflection or transmission mode depending on the material.

Testable Raw Materials

- Transparent and non-transparent surfaces, such as plastics, steel, paper, textiles and non-wovens

Features

- Reflection or transmission mode depending on the material type
- Learning function for saving defined error types for later analysis
- Easy access for sample exchange

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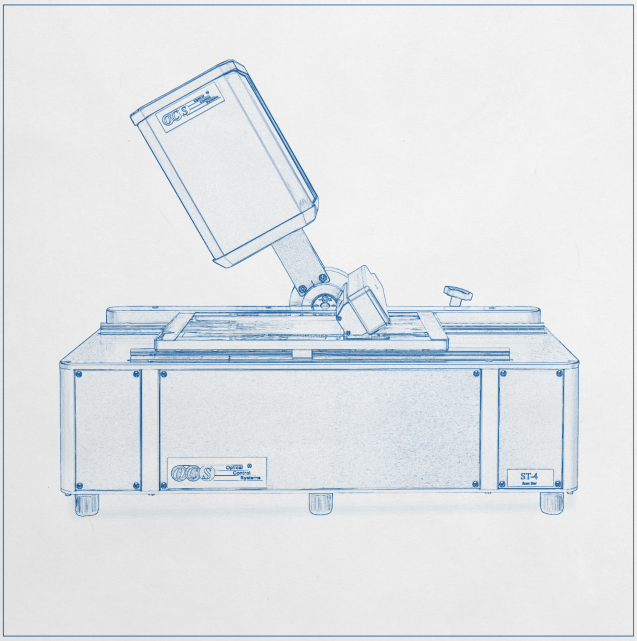
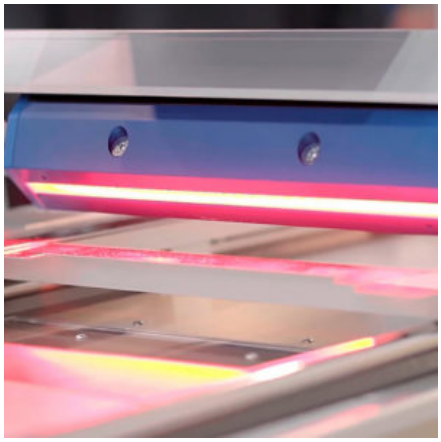
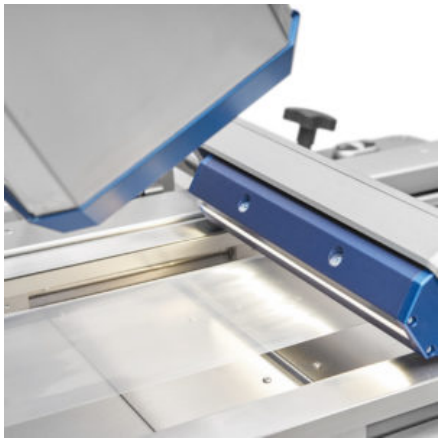
Technical Details

Camera	3CMOS line scan camera
Resolution	25 µm or 50 µm (others on request)
Effective Inspection width	0.8–160 mm (adjustable)
Effective Inspection length	0.8–400 mm (adjustable)
Lighting	Special LED line construction lighting, reflection or transmission mode, width: 250 mm (others on request)
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific







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Filter Pressure Test (FPT)

The OCS Filter Pressure Test (FPT) determines the Filter Pressure Value (FPV), i.e. the pressure rise measured over time upstream of the screen filter as an indication of the melt purity or dispersibility of added colour pigments. The OCS Measuring Extruder (ME) melts and homogenises the test material, which is then delivered to the filter via a melt pump at a defined and constant volume flow. The increasing pressure of the polymer melt is displayed, continuously recorded and finally evaluated.

Testable Raw Materials

- Pellets

Features

- Pressure and melting temperature measurement
- Simple sieve change
- Data recording and evaluation using OCS Filter Test Software
- Fulfilment of DIN EN 13900-5

Compatible with

- OCS Measuring Extruder (ME)

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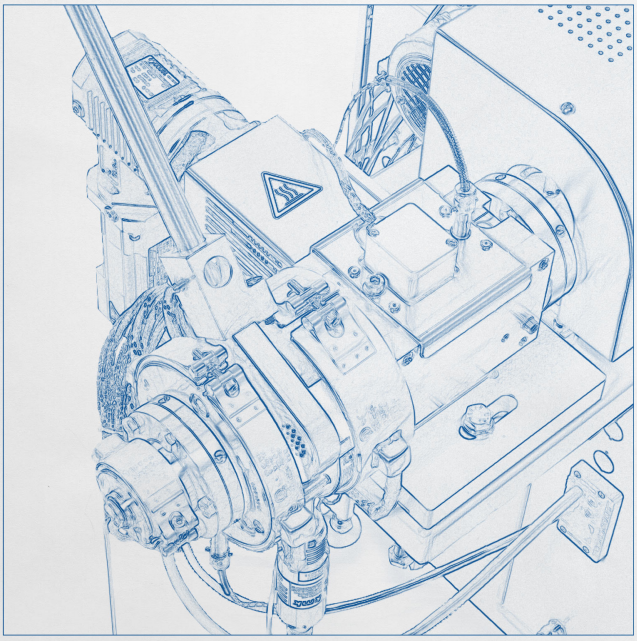
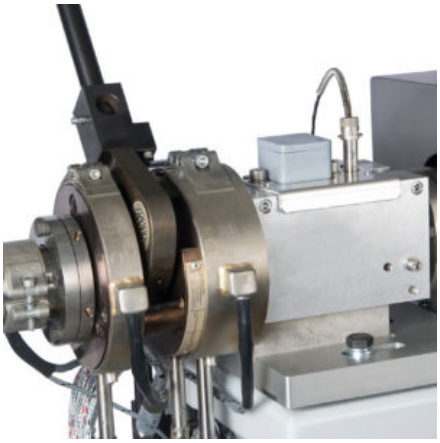
Technical Details

Barrel diameter	20, 25, 30 mm (3 heating zones with thermocouples for barrel, 4 additional heating zones for melt pump and adapter, 3 cooling zones with low-pressure blower)
Screw compression	1:1, 2:1, 3:1, 4:1, with and without mixing zone (others on request)
Rotation	0–150 rpm





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Melt Flow Measurement System (OP5)

The OCS Melt Flow Measurement System (OP5) allows the measurement of the Melt Index (MI) of polymer powder or pellet samples.

The time between sampling and measurement is 5 to 10 minutes. The OP5 melt process minimises any changes in the structure of the polymer by providing a very fast transition from solid to liquid without the negative effects of an extruder screw.

The OP5 MFR measurement process is carried out by means of exact control of the melt flow in combination with a highly precise, OCS-developed melt-pressure measurement technique. This method typically achieves a reproducibility of +/− 1%. The fast sampling reduces the delay time between laboratory and production considerably.

Testable Raw Materials

- Pellets
- Powder

Features

- Fast sample preparation and measurement
- Real-time results in 5 to 10 minutes
- High reproducibility
- One-time ISO calibration per material type and measurement range
- Real-time display via touch panel with data trends as well as optical and acoustic alarm

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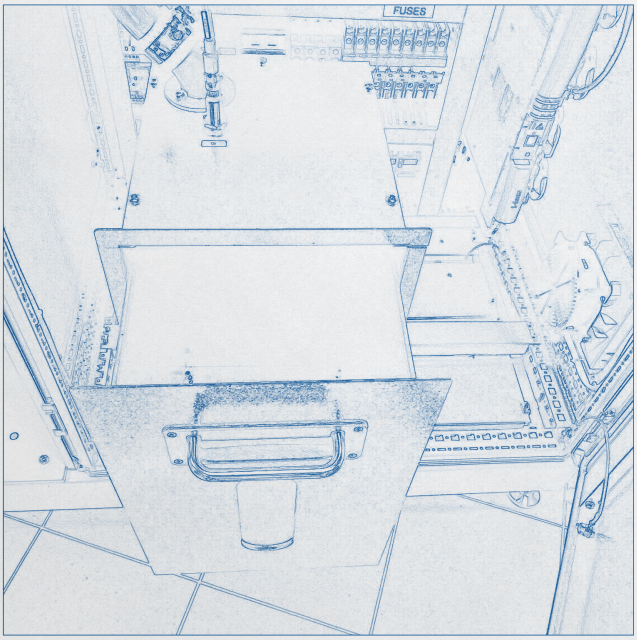
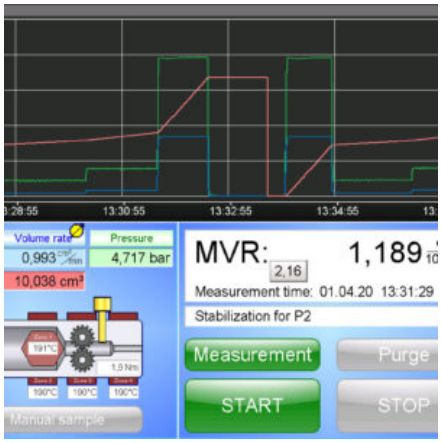
functions

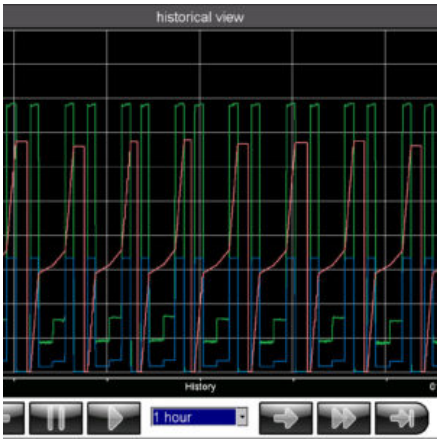
- Measurement results according to ISO1133 and ASTM D1238

Technical Details

Melt flow range	0.05–1000 cm³/10 min
Test temperature	Up to 240°C
Reproducibility	+/– 1%
Pellet / powder consumption	Approx. 0.6 kg/h
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific







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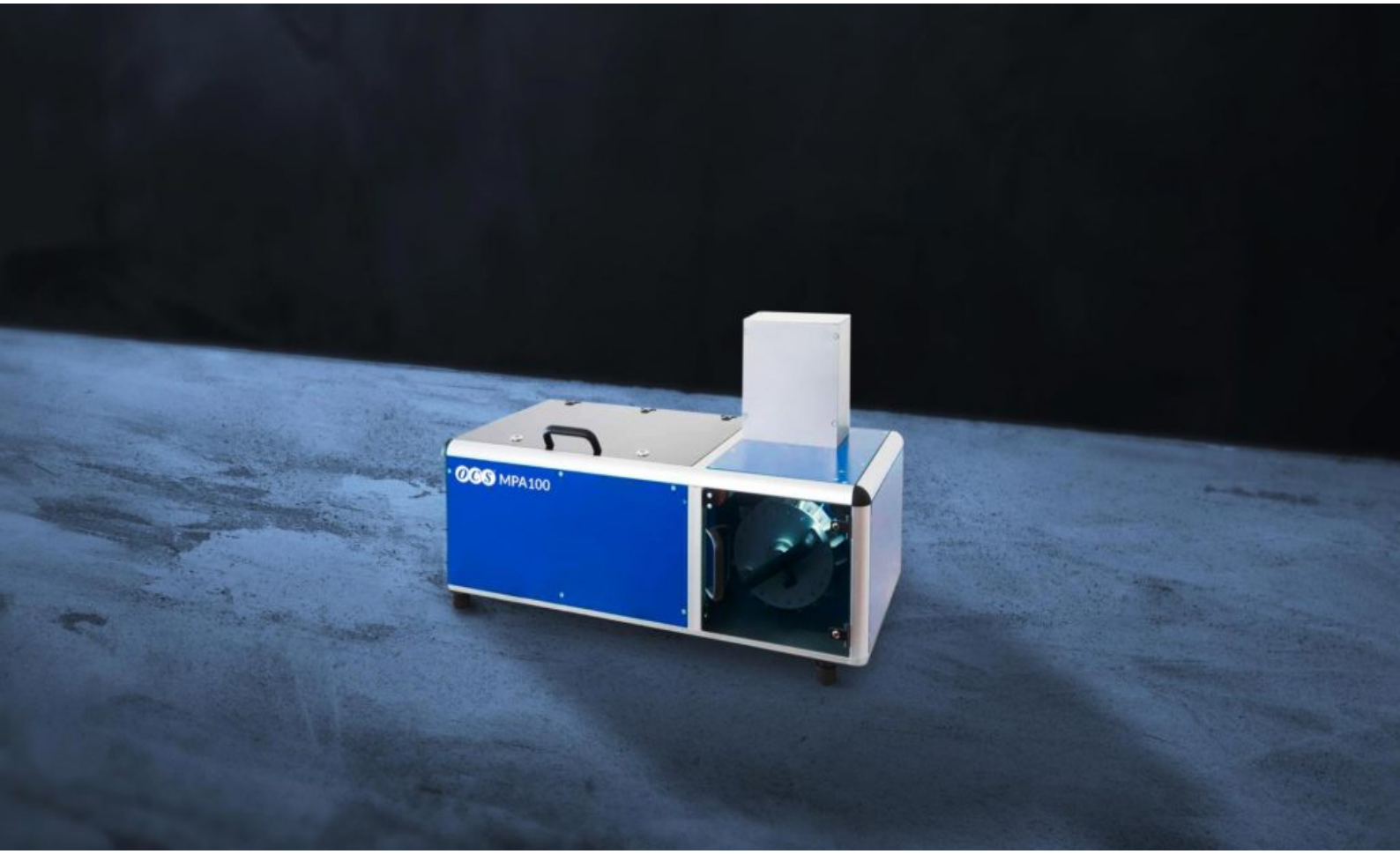

Multiple Plaque Analyser (MPA100)

The OCS Multiple Plaque Analyser (MPA100) is a compact tabletop device consisting of a high-resolution camera and an illumination unit for the detection of defects on transparent and opaque material plates in the laboratory or in research and development centres. It is able to detect a variety of irregularities such as holes, scratches or other surface contamination. After the samples are fixed in the magazine (capacity of up to 20 flat blanks), a robotic system automatically cleans each plate of dust and places it in the measuring chamber. All images from the camera are analysed and stored by special software.

Testable Raw Materials

- Transparent plaques (polypropylene, polyethylene, polycarbonate, glass, etc.)
- Opaque plaques (ABS, paper, metal, textiles, etc.)

Features

- Magazine for up to 20 plates
- Ionic air cleans the samples before each detection
- Automated plaque rotation function for plaques for double-sided detection
- Fast evaluation and presentation of the measurement results in various tabular display formats
- Defect visualisation – the defects on both sides of a plate are displayed as defect images in a mosaic view

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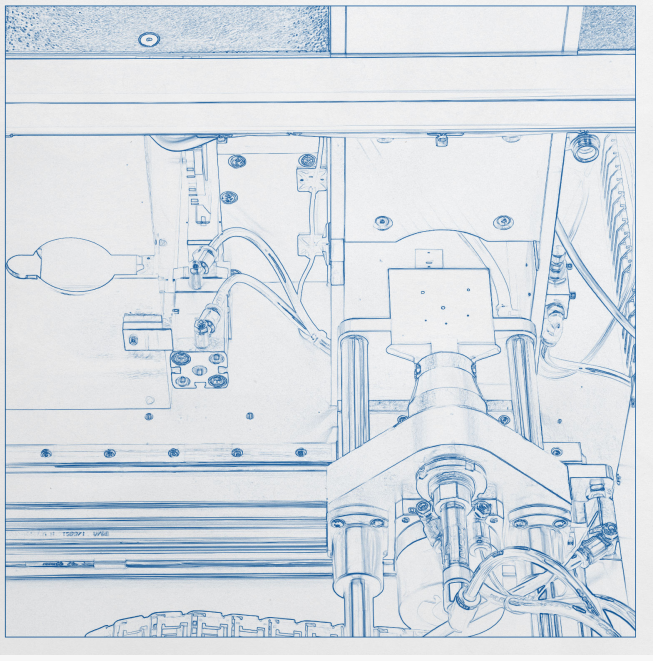
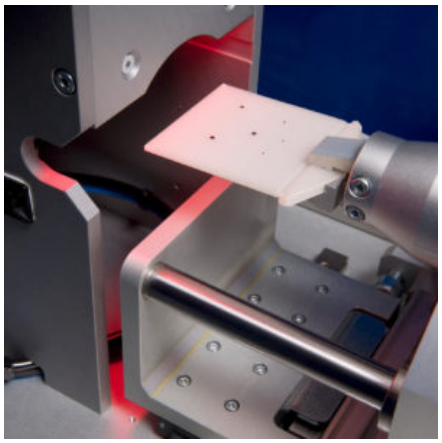
- Log data can be exported into all common file formats, such as Microsoft Office Excel, Word, etc.

Technical Details

Camera	3CMOS area scan camera
Resolution	25 µm (others on request)
Inspection range	36 × 24 mm (others on request)
Lighting	Reflection or transmission mode, LED lighting
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific





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Full Notch Creep Test (FNCT)

The OCS Full Notch Creep Test (FNCT) is a widely used method of classifying polyethylene materials in terms of their slow crack growth behaviour under accelerated conditions. A circumferentially notched body is loaded in a tempered wetting agent with a defined tensile stress, and the time until a break occurs is measured.

Testable Raw Materials

- Polyethylene materials

Features

- 15 sample stations with independent tensile stress adjustment and data acquisition
- Load application through easily adjustable lever weight system
- Precise adjustment of tensile stress through electronic force sensor
- Uniform bath temperature control through extensive bath insulation
- Exhaust air connections for targeted vapour extraction
- Continuous pH value measurement with adjustable warning and alarm thresholds
- No time limit on test times, time resolution: 1 second (real time)
- Operation via touch panel with data trend as well as optical and acoustic alarm functions
- High chemical resistance of the material used (stainless steel)
- Developed according to ISO 16770

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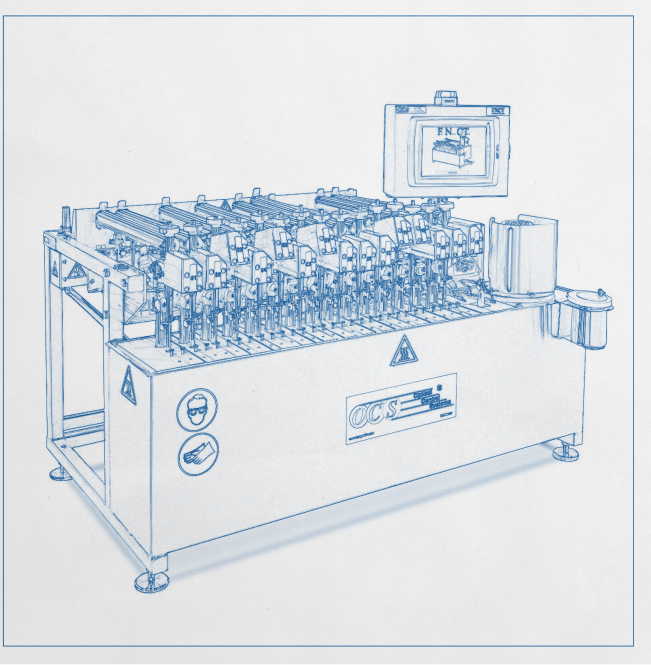
Technical Details

Tensile force range (infinitely variable pull arm system with 115–315 N)	2.5–6.5 MPa for samples 10 × 10 × 100 mm with notch depth of 1.6 mm
	15–40 MPa for samples 6 × 6 × 90 mm with notch depth of 1.6 mm
Force measurement	Electronic force sensor with a resolution of 0.01 N
Fluid volume	Approx. 55 l
Level control	Stainless steel float sensors and magnetic valves
Inlet pressure range for the supply of demineralised water	0.2–8 bar (3–116 psi)
Communication protocol	MODBUS (RTU, TCP/IP), PROFIBUS, PROFINET, OPC (Server/Client), CSV file, customer-specific



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Web Inspection System (FSP600)

With the OCS Web Inspection System FSP600, all types of irregularities in films, laminates and non-wovens can be detected in real time using high-speed cameras. They defects often reduce the quality of the film and the end product. These include gels, burners (black specks), fisheyes, holes, wrinkles, scratches, coating defects, water droplets, oil stains, insects, bubbles, nozzle marks and craters, etc.

Additional features of the FSP600 system are the data transfer of real-time results to the production and process control as well as product improvement by sorting/labelling contaminated web sections.

Testable Products

- Blown films, cast (flat) film and plate lines (PP, PET, PE, ABS, PC, PMMA, etc.)
- Coating films (aluminium, painted, etc.)
- Biaxial stretch films
- Surface protection films
- Medical and pharmaceutical films
- Optical films
- Food and barrier films
- Hygiene and nappy films, non-woven and laminates
- Technical films, etc.

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Features

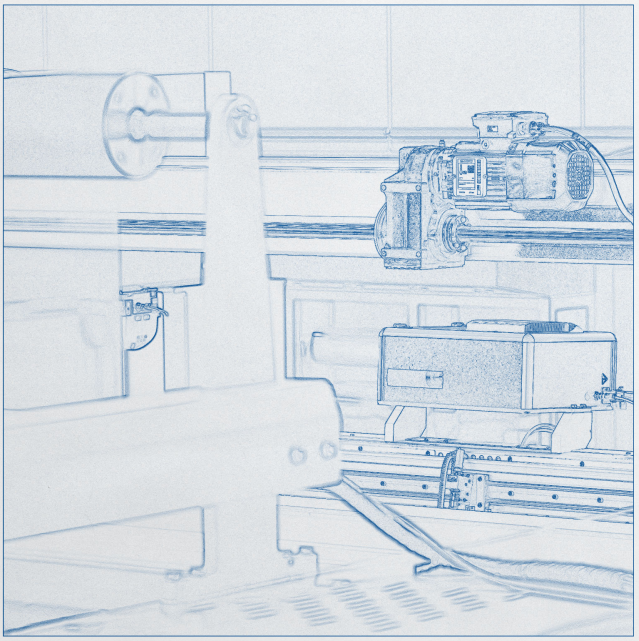
- Can be combined with transmission and reflection LEDs as well as dark and bright field applications
- Works with up to 6 channels simultaneously through MCE (Multi Channel Evaluation)
- LEDs can be controlled and triggered in sequence
- LEDs with passive cooling available in red, white, blue, UV or IR wavelengths, meeting the IP54 standard (water drop protection)
- Universal OPC-UA interface (BDE connection, connection of external sensors, e.g. metal detector, reading of machine parameters and CSV output)
- Simple Windows-based software with data management options and cut optimisation
- Teach-in of error references (teach-in function)
- Standardised classification of the film roll (calculation of marks)

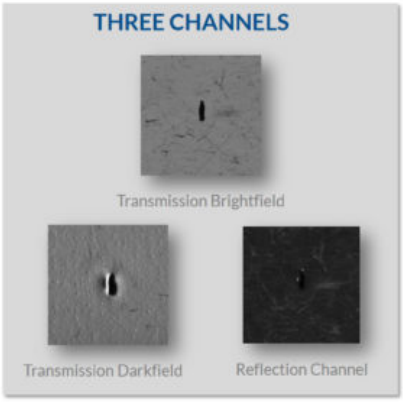
Defects

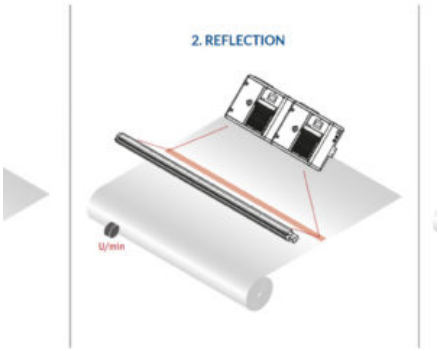
Gels, fisheyes, holes, wrinkles, etc.

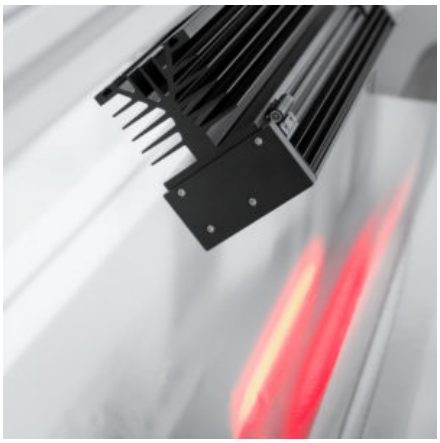
Technical Details

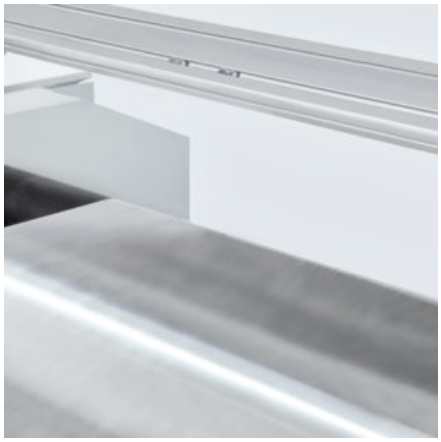
Camera	CMOS line scan camera, dual line, monochrome or trilinear coloured
Detection	Detection with up to 6 channels simultaneously (MCE – Multi Channel Evaluation) with one camera
Production speed	Up to 2,000 m/min
Inspection width	100–10,000 mm
Open interface	Easy integration of external devices (e.g. colour measurement), OPC Server Industry 4.0, easy data transfer to CSV

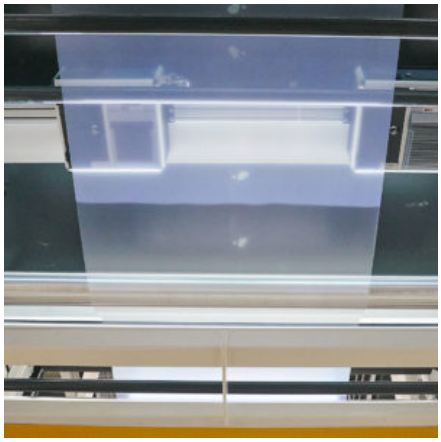












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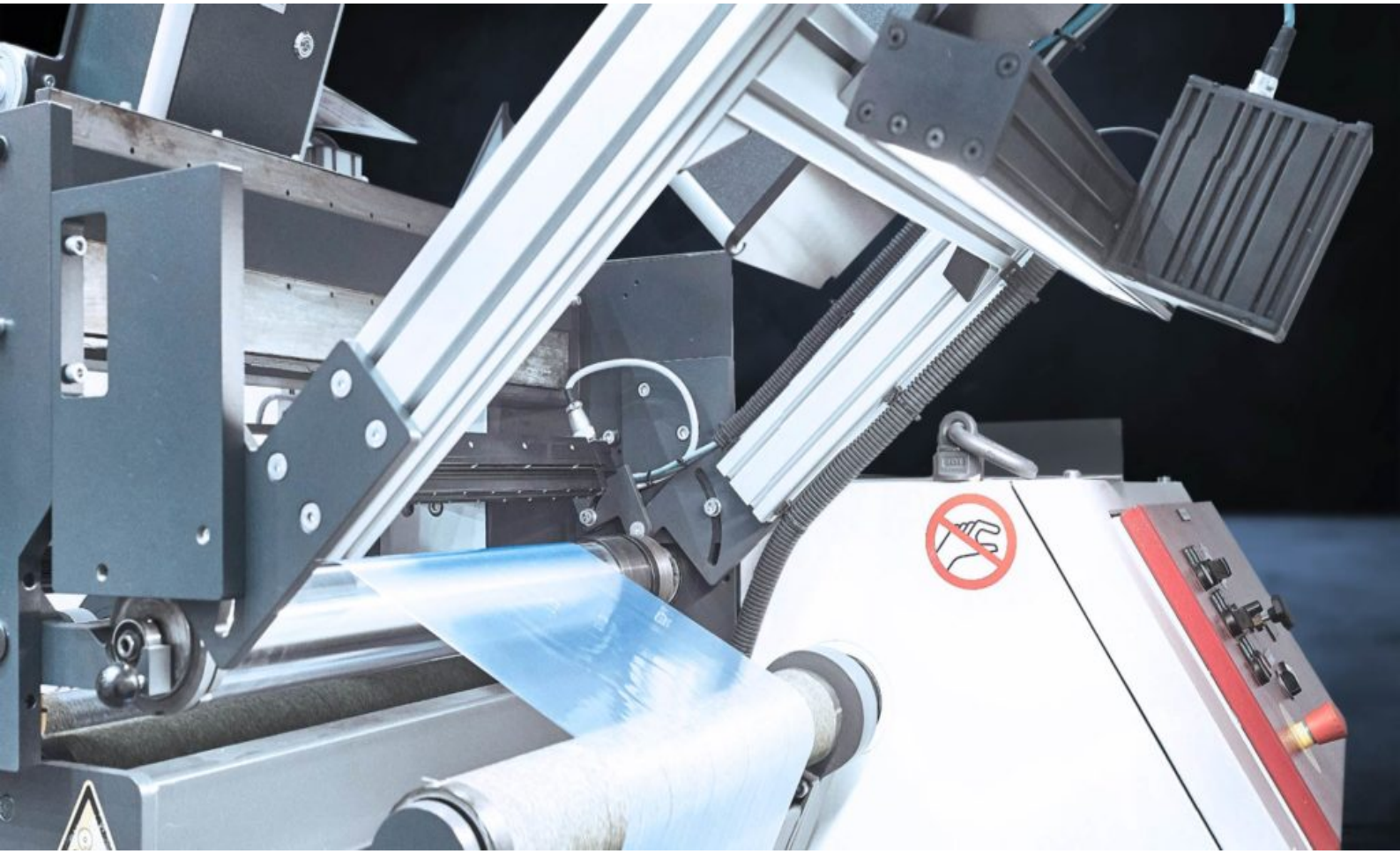

Purity Control OnRoll (PCR)

With the OCS Purity Control OnRoll (PCR), plastic films on the roll in the winder can be inspected and all types of contamination can be detected. Simple integration into the winder is possible. In addition, Purity Control OnRoll (PCR) can be implemented in the existing FSP600 system software or used as a stand-alone solution. PCR allows inspection widths of up to 10 metres. It is particularly suitable for flat, blown and cast films, biaxal stretch film, laminating and slitting lines.

Testable Products (Roll in the Winder)

- Blown films, cast (Flat) films and plates (PP, PET, PE, ABS, PC, PMMA, etc.)
- Coating films (aluminium, painted, etc.)
- Biaxial stretch films
- Surface protection films
- Medical and pharmaceutical films
- Optical films
- Food and barrier films
- Hygiene and nappy films, non-wovens and laminates
- Technical films, etc.

Features

- Easy integration into existing winders

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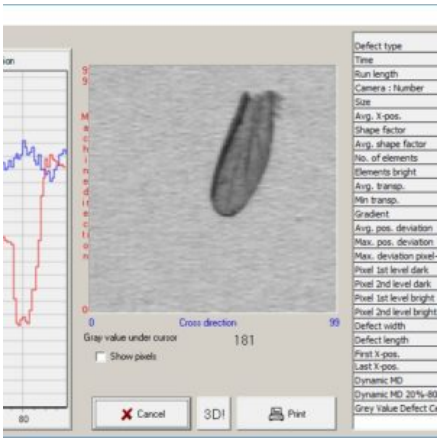
- Integration into the FSP600 Software
- Can also be used as a stand-alone system
- OCS Offline Software (documentation, alarm, statistics and error pictures)
- Inspection width of up to 10 m

Defect

Fly in film

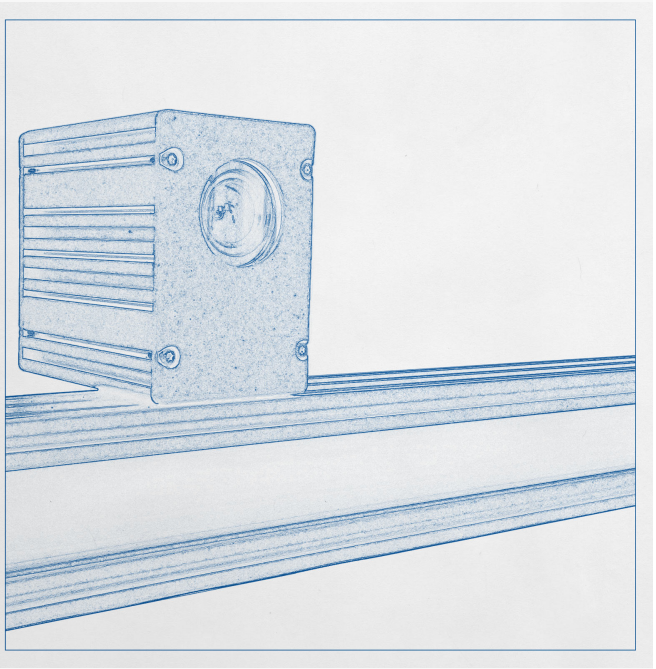


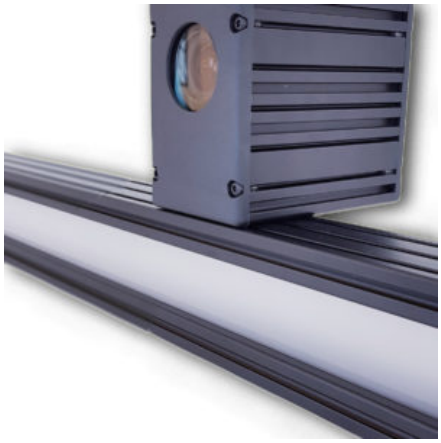
Defect

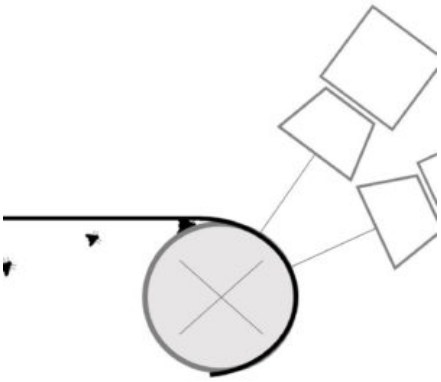
Wing of a fly in the OCS Analysing Software

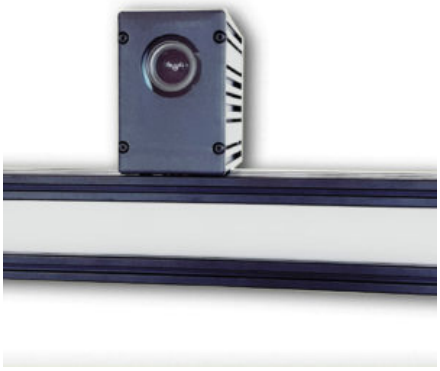
Technical Details

Camera	GigE
Lighting	LED
Device interface	Ethernet









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